Products finishing

Volume 11 DECEMBER, 1946 Number 3

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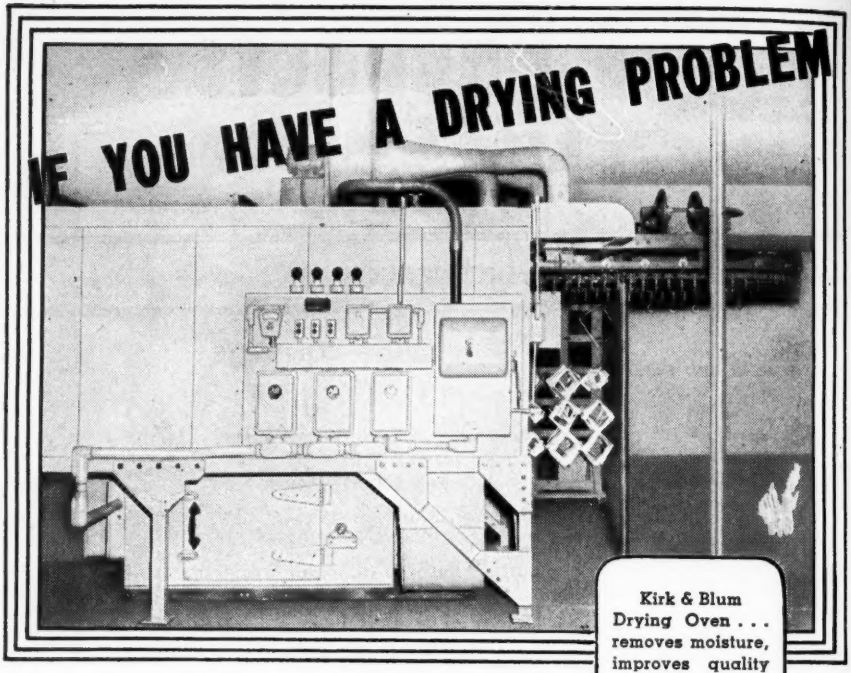

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Products finishing

Pretreatment For Quality Finish

Research has proven that the application of a finish directly over bare metal is an inferior solution to the corrosion problem. This suggests that the surface of the metal should be made as impervious to corrosion as possible prior to the application of any finish. This latter function is fulfilled by numerous so-called "rustproofing" processes available for use in modern finishing systems.

Rustproofing is not new. However, recent improvements, both in process efficiency and methods of application, will be a revelation to the industrial finisher who last employed the process some 5 to 10 years ago. The modern finishing system usually involves a combination of processes offering the ultimate in protection and appearance. In this connection the industrial finisher will do well to make a thorough study of the various rustproofing and surface treatment processes available and the advantages they offer for his particular processes.

The fundamental factors governing the retention of coating film integrity on metals may be expressed in a few essential requirements; namely, permanent adhesion, distension, distensibility, water resistance, chemical inertness, and sometimes the presence of a rust inhibitor. The extent to which these characteristics are manifested in paint coatings determines their efficacy for protecting metal against corrosion. The advent of synthetic resins and the proper formulation of these for use in paint vehicles together with advances in understanding of surface pretreatment requirements have made possible recent improvement of some of these properties.

A dangerous attitude to assume is that anything will sell in the inflated postwar market for consumer goods. The manufacturer who desires to assure his future will take advantage of this attitude to turn out products of high enough quality to assure himself repeated orders. From the industrial finisher's standpoint, pretreatment of metal to ensure the life and durability of finishes may oftentimes furnish the edge in quality necessary to make his customers come back for more.

DECEMBER, 1946 Vol. 11, No. 3

Studebaker Corporation Finishes 1947 Passenger Cars

By BRYANT W. POCOCK

SOUTH Bend's Studebaker Corporation is now turning out thousands upon thousands of brand new 1947 passenger cars. It is of considerable interest to the metal finisher to observe how the bodies and chassis for these cars are ished.

Five separate assemblie mee the body framing fixtures the floor of Studebaker's larg These are the seat pan and left rear quar and center pillar posts. These assemblies are spot welded together into a single unit by a crew of 7 operators at each framing fixture. Oil with which the assemblies are coated when received is then wiped off the under part of the which is the place reach quent fi area is sp er in a sunken booth. Bodies are then floor.

On the third floor production line additional welds are added where required to produce necessary rigidity, and all lap welds are built up with solder to a continuous, smooth surface. Mechanical finishing is done with belt sanders, as shown in Fig. 1, then with files and hand sanding. Various accessories are added along these lines such as trunk brackets, doors,and so on. Bodies are then sent to the second floor.

d floor more sub-assem- the bodies are to remove oil er cent No. 1 mmonium They 6- on ion. the following

seed oil

nse, 135 degrees F. rinse, 125 degrees F. ray Bonderite No. 100 at degrees F.

e 5. Water rinse at 80 degrees F.

e 6. Chromic acid wash at 115 degrees F.

e acid in the sixth stage is held ween 0.4 and 1.0 point, total acidity being kept under 5.0 points. Experience at Studebaker indicates that there are no sludge troubles with the new spray Bonderite 100, as the sludge remains soft and is easily handled.

From this point until the primer

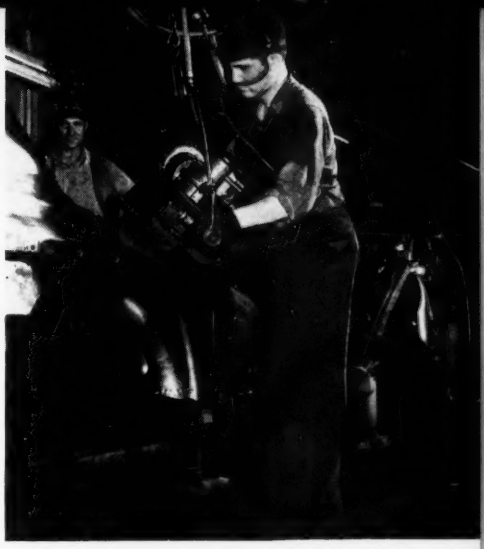


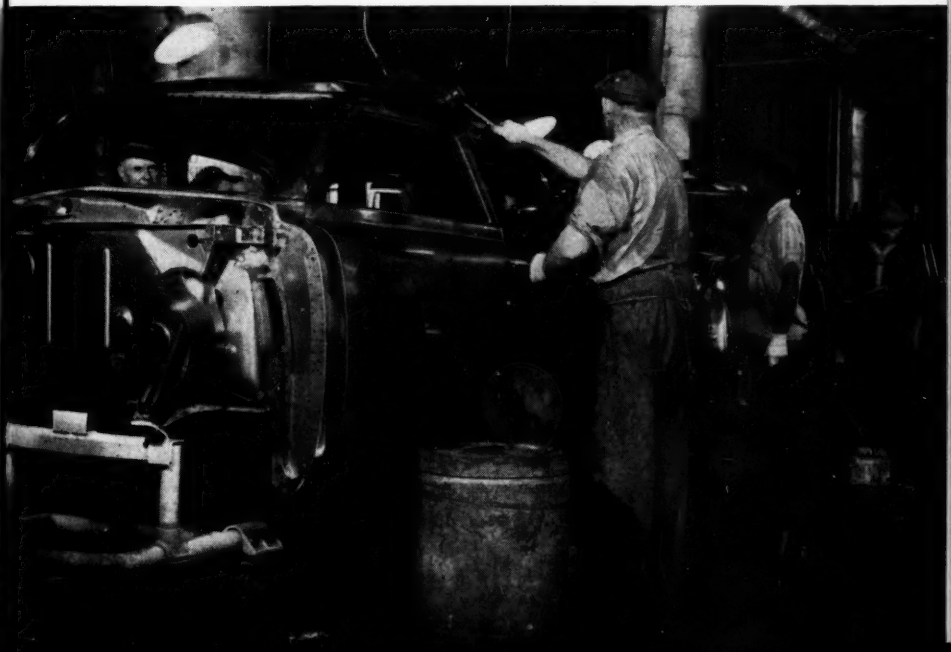
Fig. 1—After welding, Studebaker bodies are mechanically finished with the aid of sanders.

coat has been applied, Studebaker bodies are not touched by hand. They now pass through a Mahon gas-fired drying oven at 350 degrees F., passage taking 12 minutes. A Leeds and Northrup recorder keeps a record of drying conditions. This is followed by a 10-minute, hand-operated positive pressure air blow-off, and this by application of a sealer coat of filler material over soldered areas previously built up over lap welds. This seal coat is applied with 4-inch putty knives.

Bodies are then conveyed through two successive pairs of criss-cross, water-washed spray booths, where both insides and outsides are sprayed with Du Pont primer, as shown in Fig. 3. This is followed by passage for 1 hour through a gas-fired oven held at 250 degrees F. After emerging from this drying oven and adequate cooling, door locks are installed.

Bodies next pass through a pair of criss-cross, water-washed booths to receive the first sprayed coat of Du Pont undercoat surfacer. This is followed by a 5-minute setting up time, and this by passage through a second

Fig. 2—Studebaker bodies are hand brushed with a solution of 90 per cent No. 1 naphtha and 10 per cent ammonium hydroxide to remove oil.



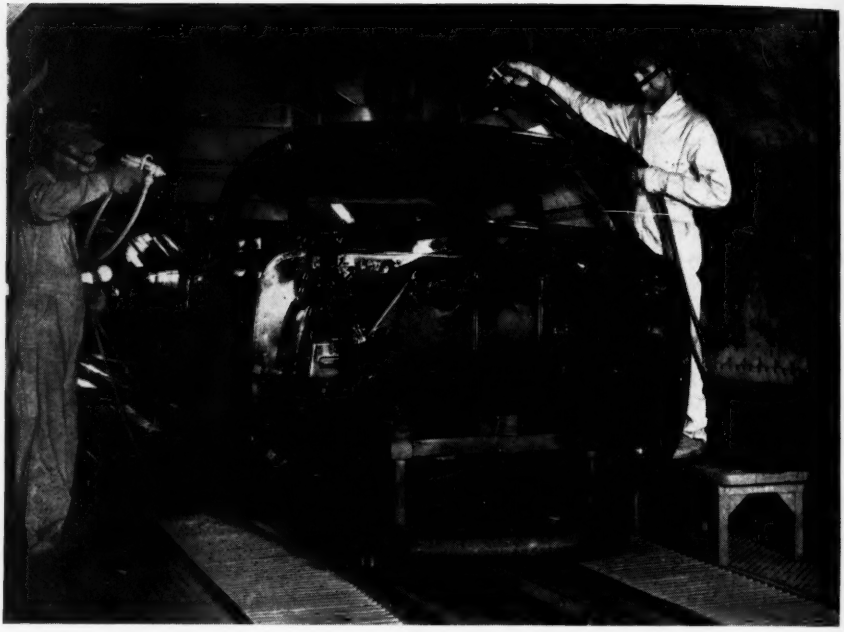


Fig. 3—Bodies are conveyed through spray booths where insides and outsides are sprayed with primer.

pair of similar booths for the second sprayed coat of Du Pont undercoat surfacer. Passage is then made through a gas-fired drying oven at 250 degrees F. for 1 hour and 10 minutes.

The next operation consists of water sanding with belt and hand sanders, water making the paper abrade more thoroughly. No. 360 grit sandpaper is used for water sanding. Bodies are then passed through a gas-fired dry-off oven at 300 degrees F. for 15 to 20 minutes. After sufficient cooling, trim sticks are installed and insulation (body deadener or "silencer") is sprayed on almost the entire inside surface.

At this point a second coating of sealer material is applied over all lap welded areas, this coating being sprayed on and consisting of a proprietary rosin solution. Bodies are then conveyed through a gas-fired dry-off oven at 250 degrees F. for 30 minutes in order to set the insulation, and are then sent to the fourth floor.

On the fourth floor, bodies are first washed by hand with No. 1 naphtha. They then enter the double lines of an air-conditioned spray room or plenum chamber maintained at 61 per cent relative humidity, dry bulb temperature being 80 degrees F. and wet bulb 70 degrees. The first operation in the plenum chamber consists of wiping the bodies by hand with tack rags in order to pick up all bits of lint or dirt, as shown in Fig. 4. Then each line of bodies passes through two water-washed spray booths separated by a suitable flow time gap between the booths. These booths are not of the criss-cross type, but the operators are staggered in position. A separate coat of color baking enamel is sprayed on

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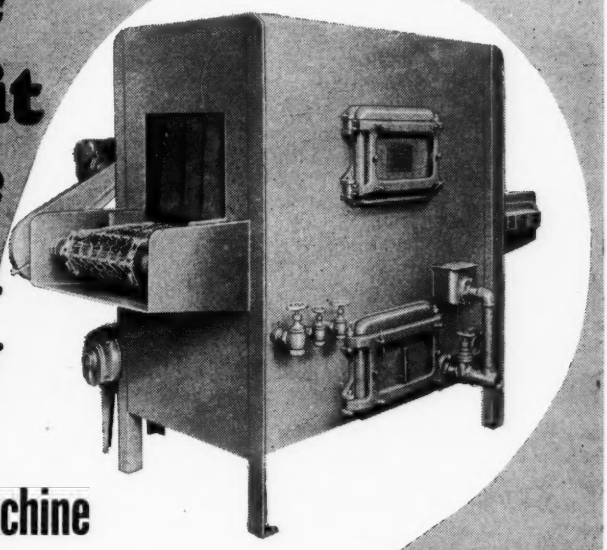

EIGHT out of ten visitors stopped to admire! "What a beauty," they said. "That's *basically* just what we need," was a comment heard from almost everyone.

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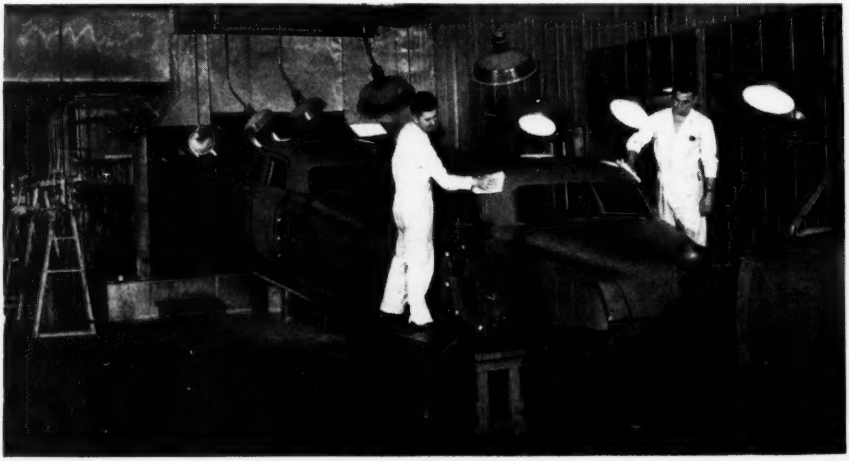
Fig. 5—Flock is sprayed over the entire interior of the trunk of the Studebaker body.

the bodies in each booth, the lighter colors being sprayed on one line, the darker on the other.

Bodies after emerging from the plenum chamber pass through a gas-fired baking oven at 250 degrees F., transit taking 1 hour and 10 minutes. This oven has 3 stages of "relative humidity" in order to prevent orange-peel wrinkling of the enamel. The high humidity allows the synthetic enamel to flatten out before setting up. This is accomplished by steam saturation of the atmosphere inside the oven to produce a condition of potential but not actual condensation. Purely empirical figures which are without meaning so far as real relative humidity in the classical sense is concerned, but which are useful for the purpose of comparison only, show "relative humidities" of 104, 109, and 112 per cent for the 3 stages in suc-

Fig. 4—Before entering paint booths, bodies are wiped by hand with tack rags in order to remove all bits of lint or dirt.



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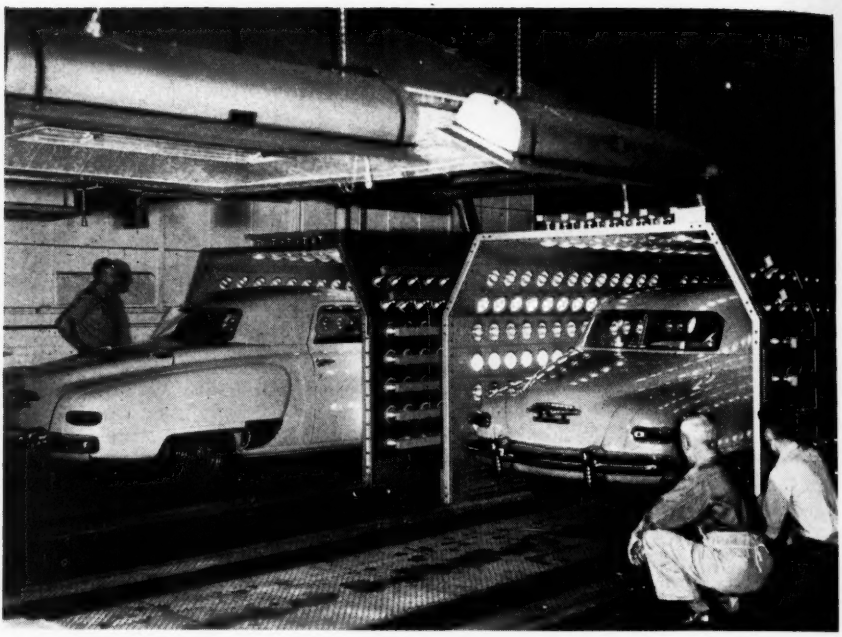


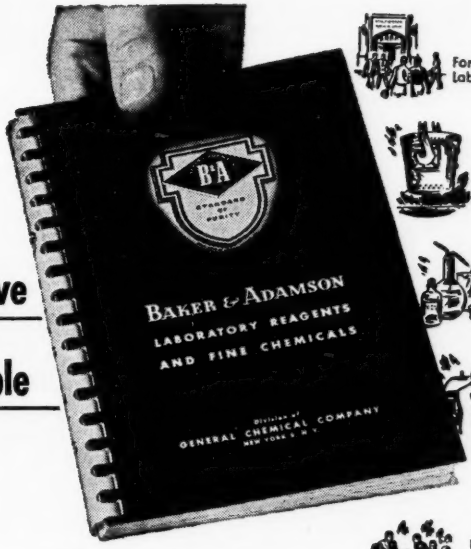
Fig. 6—Two 32-foot long tunnels, each containing 800 lamps on 20 parallel circuits, are used by Studebaker to quickly dry primer coats on paint touchup jobs.

cession. After sufficient cooling, layer insulation is installed and bodies are sent to the fifth floor.

The fifth floor is primarily used for the further installation of trim. Here, window glass, window regulators, door handles, head linings, instrument panels, garnish moldings, electric wiring, and so on, are installed. Bodies then go to the sixth floor for the installation of upholstery. Here also rubber cushions are set in place around trunk lids and hood openings, and flock is sprayed over the entire interior of the trunk, as shown in Fig. 5.

Flock is 100 per cent pure Rayon in the form of tiny fibers 1/16 inch long, and constitutes a finish in its own right. Its application at Studebaker entails spraying the interiors of trunks with an adhesive material composed of GRS latex plus a certain amount of tire stock reclaim plus 7 per cent ester gum. This is followed immediately by flock, which is sprayed on through a large hose. Another hose attached to a vacuum picks up loose flock, which is recovered and used over again. The use of flock as a trunk finish has proved exceptionally successful, producing a soft, durable surface which possesses high customer appeal. After flock has been applied to the trunks, bodies are sent to the chassis plant.

Chassis frames are received at the chassis plant with a black enamel finish. Here also are received front wheel suspensions made in Studebaker's machine shop and finished with air dry chassis black, front transverse springs and rear springs made in the spring shop, motors made in the machine shop, steering gears, and rear axles



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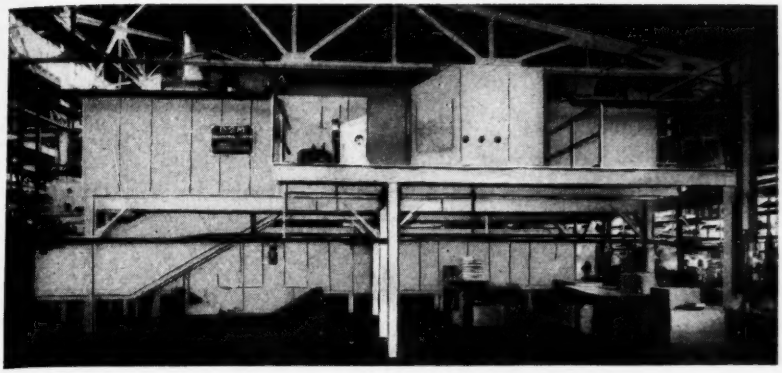
purchased in chassis black. Parts are added to the chassis all along the line, such as mufflers, gasoline tanks, motor support plates, dust deflectors, and so on, the chassis being in an upside-down position. In this position the chassis are now passed through a criss-cross spray booth to receive another coating of air-dry chassis black. Chassis are then turned over and steering assemblies and cross tie rods are installed. Passage through another water-washed, criss-cross type spray booth permits application of air-dry chassis black enamel on the top side.

At this point, L-head 6-cylinder Champion engines come up from the motor room of the machine shop all finished and painted with air-dry green engine enamel. These are now installed, and clutch and brake pedals are hooked up.

By this time, chassis have reached the second floor of the chassis plant. Finished bodies on which hoods, rear fenders, wiring and other sub-assemblies have been installed on the third floor now come down through a hole in the floor to converge with the chassis line and be installed. Radiators, headlights and front fender assemblies are now put on. Radiator grills are of 18-chrome stainless steel except for the upper moldings, which are of chromium-plated die-cast metal. No nickel is permitted in the stainless steel, as this would not then match the chrome plate. From this point on, one part after another is added all along the line from below and from both sides, and cars go off the line under their own power.

A special department entitled Production Scheduling has the responsibility of guaranteeing arrival of all parts at the right place at precisely the right moment for proper dovetailing of identical styles and finishes. The precision with which this department functions and the ensuing accuracy with which correctly styled and finished parts converge to meet at predetermined sta-

Fig. 7—Finish spray coated bodies pass around conveyor "loop" prior to entering paint drying ovens.



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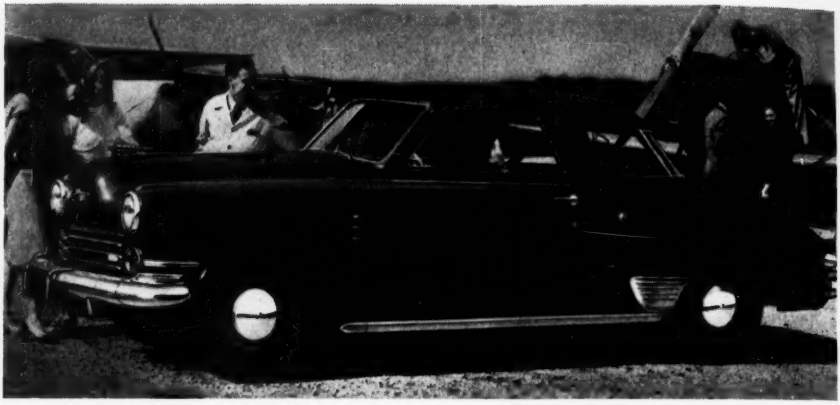


Fig. 8—A completed 1947 Studebaker five-passenger coupe in the Commander Series is shown herein.

tions represent a responsibility of considerable economic implication.

On the sheet metal line, all sheet metal destined for fenders and hoods is passed through a 3-stage Mahon emulsion type washing machine. The first stage contains a 1:40 concentration of oil emulsion, the second a 1:100 concentration at 175 degrees F., and the third is a heated blow-off chamber. The stages are controlled to leave a microscopic oil film on the metal to prevent subsequent rust formation.

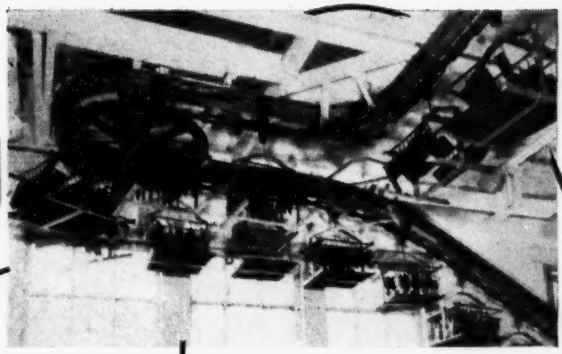
Hoods, which are finished and installed on the third floor of the chassis plant, undergo a considerable amount of hand finishing such as bumping, filing, grinding and polishing. They go through essentially the same stages as the bodies except that 2 undercoats are not necessary, no soldering being involved. Instead, a floco primer is flooded on by an automatic spray in an automatic undercoat tunnel, and is baked by heating for 1 hour and 15 minutes at 275 degrees Fahrenheit.

The first floor of the chasis plant contains the doll-up line. Here, a final checkup of the cars is made, and everything is adjusted for delivery. Doors, trim, batteries, ignition, lights, starters, and so on, are inspected, and the finish is checked for any scratches, bumps or nicks which may have been produced. If any are present, the car continues on through the final paint touchup line. There, the marred surface is given a complete undercoat, subsequently dried by passage through a bank of infra-red lamps, as shown in Fig. 6, and a finish spray coat baked on in a gas-fired oven (see Fig. 7). Although in this last operation baking is done at 175 degrees F., the car is so well insulated that its interior never exceeds 100 degrees Fahrenheit.

Fig. 8 shows a completed 1947 Studebaker five-passenger coupe in the Commander series.

The only plating done at Studebaker consists of the zinc barrel plating of bolts, nuts, screws and washers. Other plating, notably chromium, is purchased on parts as received. Even at this, 6 tons of bolts, nuts, screws and washers are plated per hour, which amounts to 96 tons per normal day of two 8-hour shifts.

All Bonderite solutions are titrated hourly at Studebaker, giving complete analyses of sprays, and so on, by pro-



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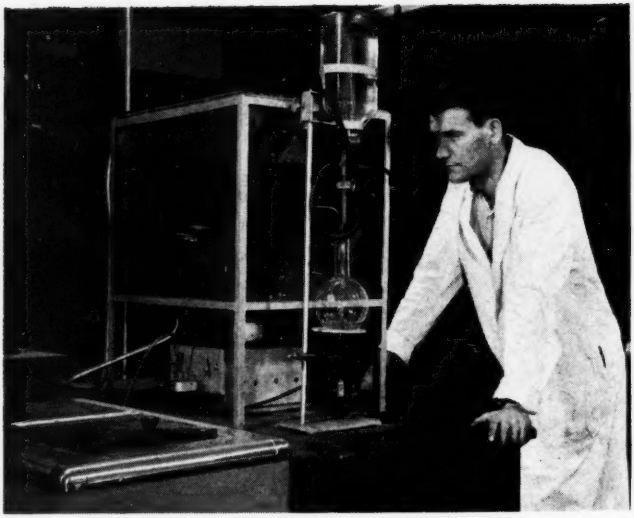

Fig. 10—Paint panels are placed in humidity cabinet for 100 hours at 105 deg. F., to check for tendency toward blister formation.

duction operators trained by the laborratory personnel and supplied by the laboratory with such standard solutions as are required. Results are checked twice daily by members of the laboratory staff.

Periodically, paint test panels are sent to a paint proving grounds and chemical laboratory at Coral Gables, Florida. There, the panels are exposed to Florida sunshine, evaluated, and returned to Studebaker for comparison with control panels. Evaluation is based primarily on such considerations as chalking, fading and checking. Standard procedure involves a 9-month test, during which the panels are returned every 3 months and sent back again. Monthly reports are forwarded to Studebaker on the behavior of each test panel. It has been found that the greatest effect of Florida sunshine occures between February and the following September. From October to the following February the ef-

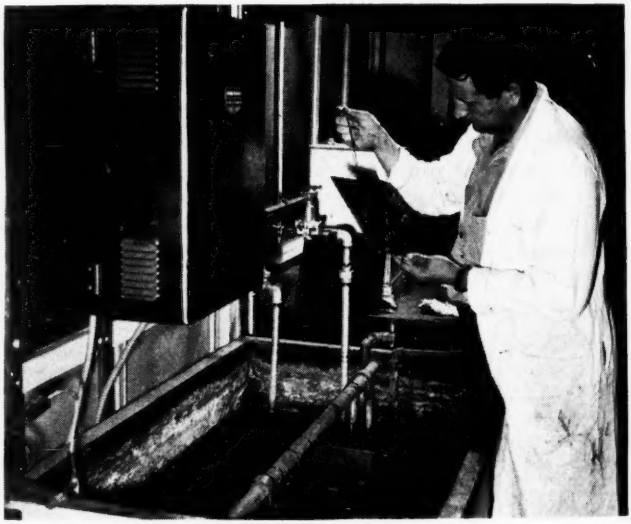

Fig. 9—Water soak tests are conducted on paint panels for periods of 100 hours or longer at 98 deg. Fahrenheit.

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This concrete example is typical of the way in which Sun Spirits has proved its value *on the job.* To get rid of dangerous cleaning materials or unnecessary expensive equipment that requires highly trained operators, let a Sun Engineer tell you how "Job-Proved" Sun Spirits can cut the cost of most cleaning operations.

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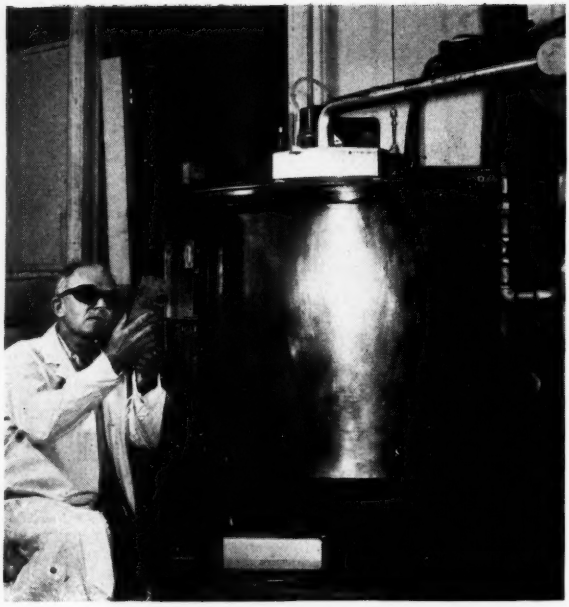

Fig. 11 — Paint samples are subjected to long periods in this Fade-Ometer where each hour is considered 24 hours under a hot Florida sun, and are then examined against true colors.

fect is equivalent to that produced during the summer months in Indiana. There can be no doubt, however, in the minds of Studebaker engineers that dew is more effective than sunlight or even ultraviolet light in causing chalking and checking. The combination of light plus dew is very effective.

Paint tests are also conducted at Studebaker's own experimental and control paint laboratory. These tests are performed on both 8 by 10 and 3 by 9-inch panels, which have been treated exactly in accordance with all stages of actual production practice, even to Bonderizing. These panels are ordinarily aged for 1 week, but if results are particularly urgent, 150 degrees F. for 100 hours is used as the equivalent of 1 week's aging at room temperature in the open air of the laboratory. This equivalence has been shown by hardness measurements, which come out the same in either case. A favorite method of measuring hardness of paint films at Studebaker involves the use of the following graduated series of Van Dyke Eberhard Faber pencils: 6B, 5B, 4B, 3B, 2B, 1B, B, HB, H, 1H, 2H, 3H, 4H, 5H, and 6H. The "leads" of these pencils are prepared by flush flattening their ends straight across on sandpaper. They are held at a 45-degree angle in use, the operator bearing down as if writing on the paint film and pushing straight away from himself. It is felt that this affords a fairly accurate estimate of hardness provided the same operator always performs the test.

Water soak tests are conducted for 100 hours at 98 degrees F. (see Fig 9). These tests are particularly suitable for showing up tendencies to blister formation. Some panels which will not blister during the water soak test, however, have been known to blister in the humidity cabinet, and vice versa. The humidity cabinet, as shown in Fig. 10, is therefore also used, the time being 100 hours at 105 degrees Fahrenheit.

Three 3 by 9-inch panels are made for the exposure tests, one going to Florida, one being held as a control standard, and the third being exposed in the Fade-Ometer shown in Fig. 11. Fade-Ometer tests total 500 hours, according to the following schedule.

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for the surface treatment of metals

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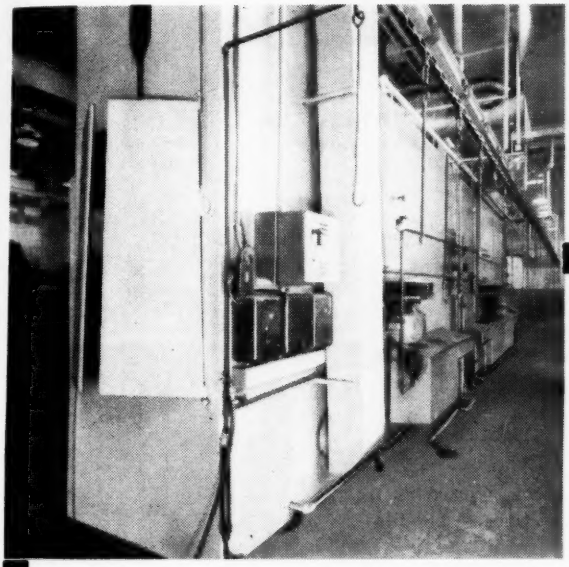

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2. **MAKE SURFACE MORE RECEPTIVE TO PAINT** than any other method.
3. **REMOVE** brazing flux, lime drawing compounds, oil from cold rolled stock and all kinds of rustproof slushing oils.

*Work varies from very light small stampings to large fabricated cabinets and very heavy fabricated parts.

And here's another advantage: when two coats of paint are required, shut off the pumps leaving exhaust and drying blowers operating and run the work through the machine the second time to dry it before the second coat of paint.

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Panels are first exposed 125 hours to ultraviolet light, being sprayed wth water for 10 minutes every 2 hours. A ¾-inch longitudinal strip is now covered with masking tape and the remaining three-quarters of the paint film is polished with Parko Gloss. The cycle is repeated for another 125 hours, another strip is covered, and this is continued until four complete cycles have been run. After each 125-hour cycle, the tape is removed and the paint film washed with naphtha to eliminate any transfer from the tape.

For purposes of evaluation during inspection, one hour in the Fade-Ometer is considered equivalent to 24 hours of average Florida sunshine. Fade-Ometer and Florida panel tests are conducted on each new color used or contemplated at Studebaker Corporation, as are water soak and humidity cabinet tests. Each batch of primer and surfacer is checked by water soak and humidity tests. The color of each batch of color enamel is compared with that of an original standard by visual examination under Westinghouse artificial daylight illumination. Gloss is measured in gloss per mil by a Henry Gardner 60-degree gloss meter. The lens of the meter box forms an angle of 60 degrees with the horizontal. A standard built into the meter for purposes of calibration consists of a reference of polished black glass having a specular gloss of 95 per mil.

Naz-Dar Silk Screen Colors, Supplies, and Equipment are the subject of a 44-page illustrated catalog prepared by the Naz-Dar Co., 469-483 Milwaukee Ave., Chicago 10, Ill. Information, including list prices, is presented on various types of silk screen process colors, paint brushes, lacquer adhesives, cleaning solvents, roller coating machines, varnish, and numerous other products. Copy of Catalog No. 24 free upon request.

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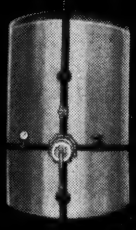

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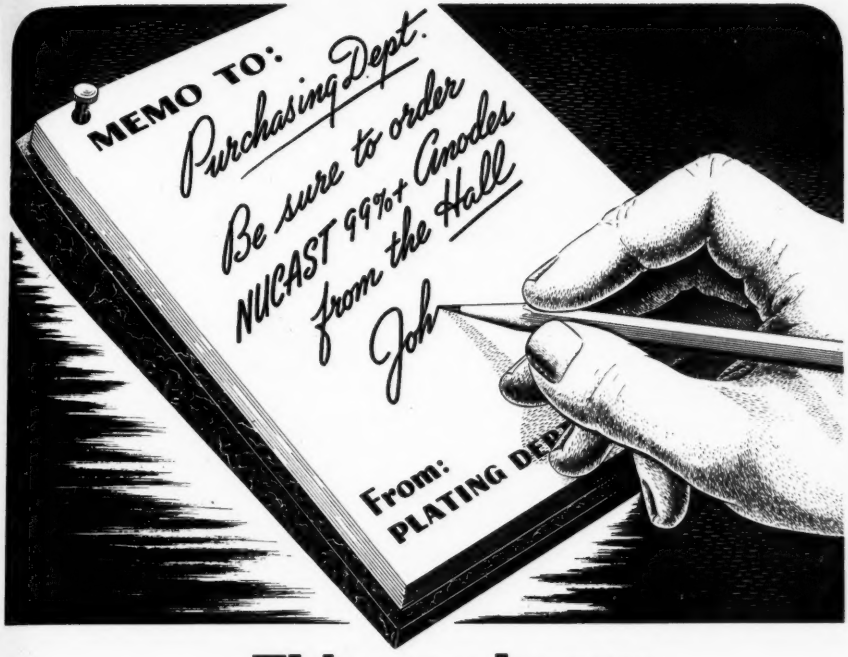

This man knows

that NUCAST 99% PLUS Nickel Anodes are always the same.

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BOX A

Finishing Clinic

Preparation of Iron and Steel for Painting

METAL finishing men attending the recent Second Annual Symposium on "Modern Metal Protection" at Cleveland, Ohio, were reminded in a presentation by R. E. Gwyther of The Sherwin-Williams Company that paint protects metals in two ways. The first is by separating the metal from its corrosive environment. The second is by the use of inhibitive pigments, which provide protection when the paint is penetrated by corrosive elements. However, in spite of this dual nature of paint protection, even the best of paints applied to an improperly prepared surface may fail to afford the desired degree of protection.

Cleaning. In general, all foreign materials must be removed from the surface of metals before painting. Small quantities of oil and grease will prevent adhesion between the paint and the metal. Paint which does not have a good bond with the metal tends to blister when exposed to moisture. Blistering is aggravated by the osmotic effect of water-soluble materials present on the metal surface.

The following are methods for cleaning sheet or other smooth metal surfaces. A widely used but undependable method of **solvent** cleaning is to wipe the metal with rags soaked with petroleum or aromatic solvents. Spray application of the solvent is more effective. For test panel cleaning, The Sherwin-Williams Company has employed spray solvent cleaning with considerable success, using a mixture of naphtha and xylol. The procedure is to spray the solvent

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Run Cool – Hold Their Shape
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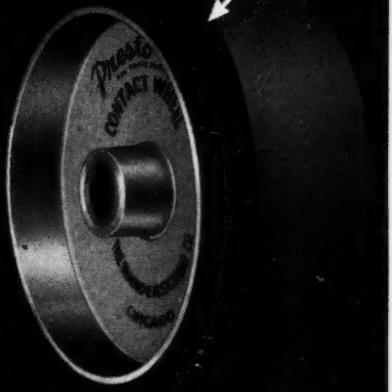
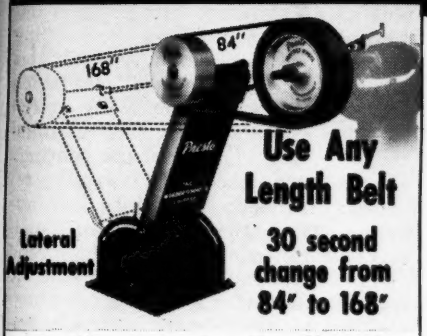
Snaps belt as it leaves the work. Beats it clean with 72 hammer blows per revolution (14" wheel).



Presto Back-Stand Idler



Adjustable spring tension with snubber action eliminates vibration and assures a smooth running belt even with out-of-round wheels or irregular work application. Rugged all steel construction. Double sealed ball bearings. Perfectly balanced aluminum pulley. Carried in stock. Jobbers in principal cities.

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from an acute angle with an ordinary paint spray gun, with atomization jets nearly closed. This method is under test by the A.S.T.M. as a possible standard method for test panel preparation. An important application of solvent cleaning is vapor degreasing, using trichloroethylene or perchloroethylene. For stubborn soils, immersion or spraying methods may be used, the final cleaning in any case being in the vapor phase.

Alkaline cleaners may be used by immersion or by spraying, but must be

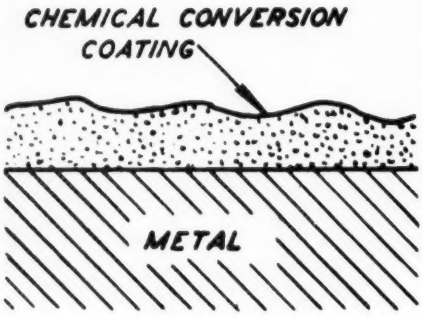


Fig. 1—Sketch of a corrosion product layer, such as produced by chemical treatments, which is physically protective to the underlying metal.

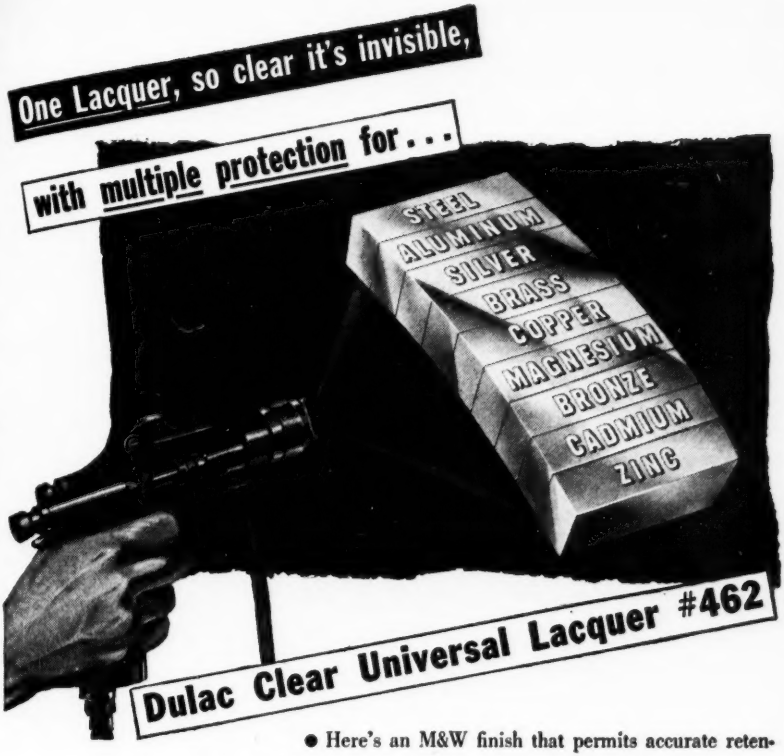
followed by very careful rinsing, since any alkaline residue will react with saponifiable portions of the paint, destroying paint adhesion. Emulsifiable cleaners, consisting of grease solvents plus soaps and detergents to provide better emulsification and rinsing qualities, may be sprayed, dipped, or brushed on the metal, with thorough rinsing following. These cleaners present the advantage of flexibility of use.

Mechanical scraping, wire brushing, or sanding by hand are methods used for the removal of corrosion products and scale from heavy metal. Blasting with sand, grit or shot produces a chemically clean surface. A recent patent in blasting technique includes the addition of rustproofing chemicals to the abrasive to afford passivation and cleaning simultaneously. **Pickling** is widely used to remove scale and corrosion products. **Electrolytic pickling** is sometimes used in molten caustic or in molten salts for removing mill scale and other corrosion products from steel. **Flame cleaning** is used to remove scale by extremely rapid heating of the work followed by rapid cooling. Differences in expansion cause the scale to break away from the underlying metal. Flame cleaning is also used to remove condensed moisture from structural steel prior to painting.

Chemical Treatments for Iron and Steel. Phosphate treatments have been found very successful for iron and steel prior to painting. The phosphate solution consists of an aqueous solution of phosphoric acid saturated with phosphates of the metals (principally) iron, manganese, zinc, or cadmium, plus an accelerator. Iron or steel immersed in the solution at near boiling temperature for one to five minutes is coated with metal phosphates which are crystalline and chemically united with the metal surface, such as illustrated in Fig. 1. Phosphate coatings are insoluble, passive to corrosive reactions, abrasion resistant, and adherent. Thus, they provide an excellent base for paints and prevent spread of corrosion under the paint film. A typical production sequence for phosphating is as follows: (1) alkaline clean, (2) rinse, (3) rinse, (4) hot phosphate dip or spray, (5) rinse, and (6) dilute chromic acid rinse.

Phosphoric acid cleaners consisting of phosphoric acid and grease solvents, such as alcohols, chromates, and synthetic detergents, may be applied hot in a process similar to that described above. The amorphous coating thus produced permits maximum paint gloss.

Chromic acid in very dilute solution



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is used as a final rinse after phosphating. A chromic acid rinse as a single operation after cleaning has been found to have considerable passivating effect on iron and steel. One mechanism of the chromate passivation of iron is illustrated in Fig. 2. A typical production sequence is as follows: (1) alkaline or emulsion clean, (2) cold rinse, (3) hot rinse, and (4) rinse in hot dilute chromic acid or, in some cases, dilute chromic and phosphoric acid mixture.

Structural Steel. The most pertinent

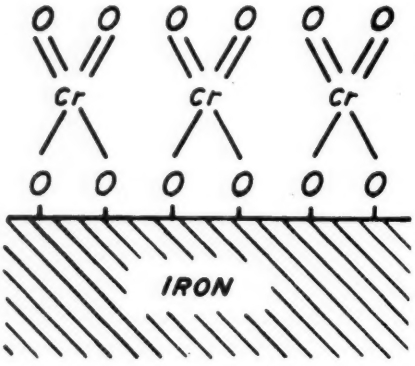

Fig. 2—Type of film which is formed when iron is passivated by chromates.

characteristic of structural steel is the presence of hot rolling scale. The scale is comparatively brittle and will crack or break under stress, particularly if heavy. Rust tends to form at crevices and spread between the scale and the metal. An effective method for scale removal is by pickling or blasting followed immediately by a chemical treatment or a coating of primer. As shown in Fig. 3, a very inefficient way to remove scale is first to loosen it by weathering. Unfortunately, this method is rather widely practiced.

Hot phosphate treatments are excellent for structural steel, however, the process can be used only prior to erection of a structure. Phosphoric acid cleaners are used successfully for cleaning ship hulls, storage tanks, and other relatively smooth surfaces. If used for structural framework containing joints, crevices, and so on, in which the acid can collect, excess phosphoric acid must be removed from crevices or from under loose edges of scale. If not removed, the resulting damage to the paint film will more than offset the value of the treatment.

* * *

Rhodium Plating Baths May Require Purification

RHODIUM is finding an increasing number of applications as a finishing metal. The explanation may be found in the hardness and brilliant bluish-white color of the rhodium deposit and in the fact that rhodium-plating solutions are easy to operate, are not very critical in regard to current density conditions, and have excellent throwing power.

The rhodium plating baths in practical use today are either of the rhodium sulfate or rhodium phophate type and have a metal concentration of about 2 gm./1. (5 dwt./gal.). The acid concentration is not very critical and can range from 10 c.c./l. upward for either the sulfuric acid or phosphoric acid types of solution. The best working temperature is around 40 to 45 deg. C. (110 to 125 deg. F.). A current density of from 10 to 100 amp./sq. ft. may be used. Insoluble platinum anodes are employed, and the metal content is replenished by the addition of a concentrated rhodium solution.

It has been found that some rhodium plating baths may begin to yield dull deposits after a period of use due to contamination of the plating solutions with impurities, principally zinc. A method of purifying rhodium plating solutions involving the precipitation of certain metallic

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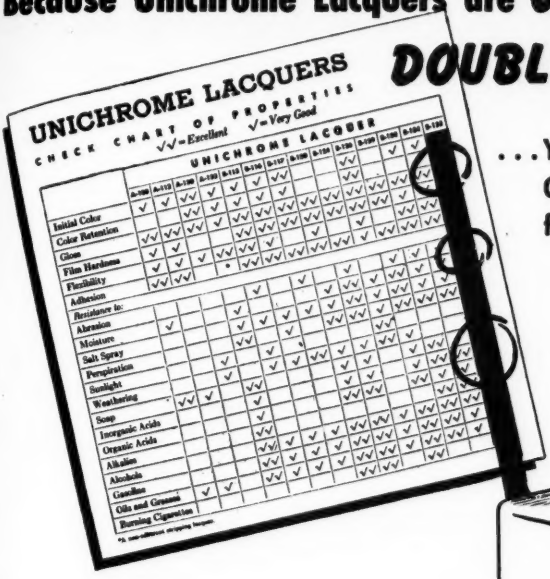

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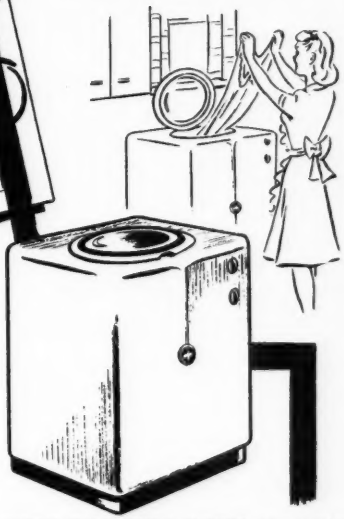

BEFORE YOU DECIDE on a finish for your products, jot down—in order of importance—the properties the finish should have. Then consult the convenient check chart above. Chances are that, among the 14 standard Unichrome lacquers listed, you can find exactly the finish you want—checked (very good) and double-checked (excellent) for its ability to stand up under specific service conditions.

And remember that intensive research and experience stand back of every Unichrome coating. Only highest quality materials go into their formulations . . assuring you uniform results and performance. It will pay you to investigate Unichrome lacquers. We'll be glad to send you *full size* copies of the check chart, together with information on typical uses and methods of applying. Write today to your nearest Unichrome office.

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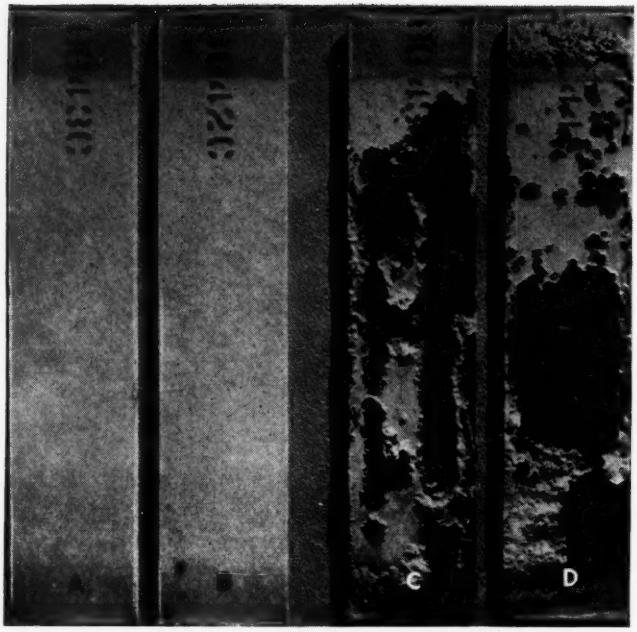

Fig. 3—Weathering of steel prior to painting is an objectional practice. Panels C and D were exposed to weather for three weeks and then wire brushed to remove loose scale prior to painting. Panels A and B were painted before exposure to weather. All four panels were painted with one coat of synthetic zinc chromate primer and one coat of synthetic paint and then exposed for twenty-two months at the Sherwin - Williams laboratory in Chicago. Panels A and B were found to be in excellent condition, whereas panels C and D were complete failures due to the effect of corrosion products remaining on the surface before painting.

impurities with potassium ferrocyanide was described in a paper presented by A. Brenner and W. A. Olson, National Bureau of Standards, Washington, at the 1946 annual meeting of the American Electroplaters' Society in Pittsburgh.

Rhodium plating solutions become contaminated rather readily, according to Brenner and Olson, due to the fact that the acid solution rapidly attacks materials accidentally introduced into the bath. Contamination by small amounts of impurities is first noticeable by a decrease in the reflectivity of the deposit. Larger amounts of impurities will cause a visible darkening of the deposit, which, in severe cases of contamination, may become almost black.

A simple method of purification is available which can be applied in the plating shop and does not involve great expenditure of time or money. It is based on the precipitation of most of the metallic impurities, such as zinc, iron, cadmium, nickel, cobalt, silver, mercury, and lead in the acid rhodium solution by potassium ferrocyanide. Under these conditions, rhodium remains in solution. Copper is not completely precipitated by this treatment since its ferrocyanide is soluable in mineral acids.

To determine the amount of potassium ferrocyanide required for purification of the bath, a titration is carried out on a 250 ml. portion with potassium ferrocyanide solution containing about 20 gm. of $K_4Fe(CN)_6 \cdot 3H_2O$ per liter. From the results of the titration, the amount of potassium ferrocyanide which must be added to the main bath may be calculated.

* * *

Systematic Inspection of Finishing Department Required for Ultimate in Plant Safety

IT is generally agreed that one of the most hazardous production

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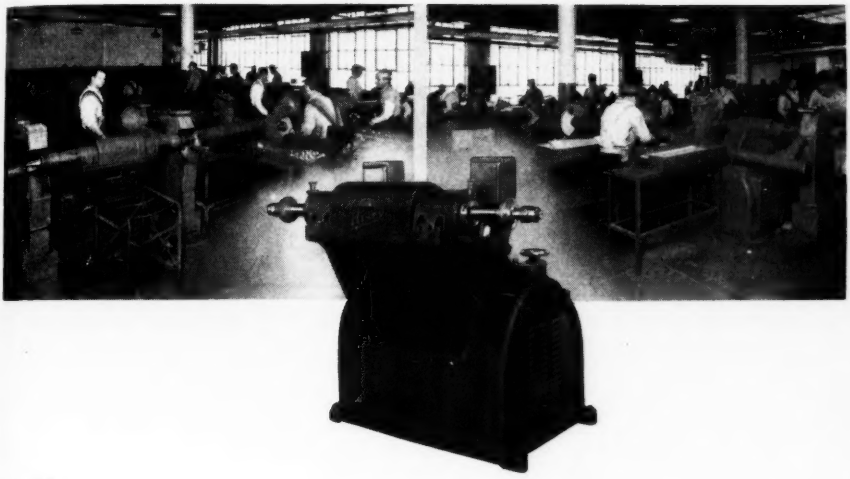

FOR twenty years, on every working day, these Hisey Polishing Lathes, illustrated above, have been in continuous operation in the finishing room of a large Eastern Manufacturer.

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areas in the average plant is the finishing department, where there are definite fire and health hazards. Safeguarding against these hazards can only be certain by the use of a planned, systematic checkup, carried out at regular intervals at all danger points.

The danger of fire is usually always present in the finishing room, even when above the average in precautions are taken, since organic finishing materials are as a rule of an inflammable nature. Among the protective measures provided should be portable fire extinguishers placed where they are readily available and where access to them is not likely to be cut off by fire. When used to provide general protection for an area containing normal fire hazards, extinguishers should be so placed that at least one large one or two small ones can be reached by traveling no more than 50 feet from any point in the area. Fewer extinguishers are required where the fire hazards are light, more where they are severe. When the extinguishers are used for safeguarding a specific fire hazard, they should be mounted near it but not on or so close to the hazards that they will be involved if a fire occurs. If the particular hazard is located in a relatively small room or small division of the finishing department, it is good practice to mount the extinguishers either just inside or outside doorways leading into the room. Operators can easily get to extinguishers so placed and have a safe line of retreat in case of necessity.

Extinguishers may be mounted on columns or walls, with hangers, brackets, or shelves as supports. The tips of easily handled units should not be more than 5 feet from the floor. With heavy units, this distance should not exceed 3½ feet. Extinguishers should be placed where they can be plainly seen. When they are wholly

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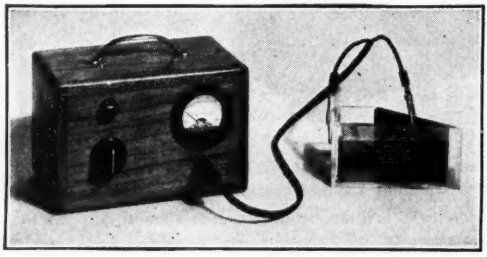

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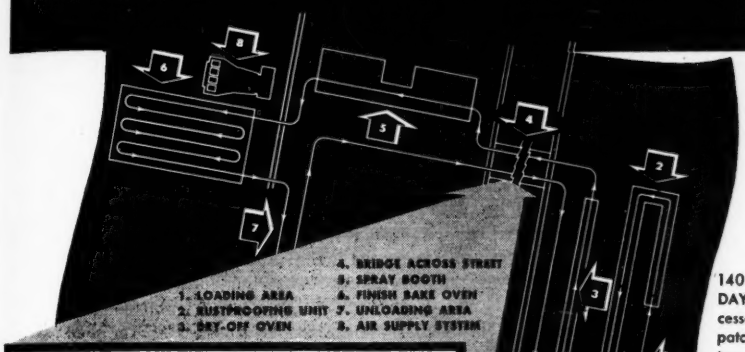

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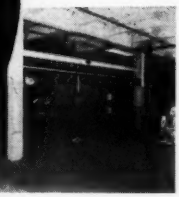
it jumps a 60-ft. street to solve a finishing problem

Confronted by an unusual problem involving space, handling, and finishing capacity adequate to turn out 1400 kitchen cabinets and other household appliances per day, DESPATCH engineers planned and installed the Finishing System you see above.

To do the job it was necessary to work on third floor level, to use two buildings, the roof of a third and to cross a 60-ft. street besides. Material remains on an endless conveyor 1000 ft. long.

Engineered, planned and installed under *one* responsibility, this typical installation explains why DESPATCH's broad experience in this field guarantees superior results . . . assures *you* of a unified, efficient Finishing System designed to provide maximum production at minimum cost.



Six-stage *Spra-Bond*-erite unit as seen from loading area. Entrance at right, exit at left.

Exit end of dry-off oven. Material leaves oven on conveyor and is carried over bridge into building across the street.

Finished parts leaving finish bake oven. Conveyor makes 6 horizontal passes through oven, traveling 225 feet.

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or partly concealed, their location should be marked with conspicuous signs. Nothing that might interfere with the accessibility of an extinguisher should be placed under or near it. All extinguisher locations should be checked frequently and any obstructions found should be removed immediately. These suggestions are based on recommendations of the Safety Research Institute.

Since there is a wide variety of potential causes of fires, to eliminate them all requires the use of a point-by-point inspection program, whereby nothing is left to chance, impression, or observation. The various health hazards of the finishing room may also be difficult to eliminate, although they can be definitely controlled by analysis of the problems involved and by adopting corrective measures. A definitely planned "safety inspection check list" will enable the best finishing engineer or executive to instantly spot potential sources of trouble. Such a check list should include definite inspection of: (1) methods of handling and storage of finished materials and solvents, (2) cleaning practices, and (3) fire, health, and mechanical hazards that may be involved in spraying or dipping practices and baking procedures.

In considering additional points of inspection in the finish department, it may be advisable to consider the State industrial laws and regulations, as well as fire and compensation insurance company regulations. The important factor for safety sake is to have a planned systematic safety inspection procedure for the finishing department so that no points of danger will be overlooked.

* * *

Silicone Coatings Offer Interesting Possibilities

A RELATIVELY new addition to the thermosetting resin family is potentially very interesting to the metal finisher dealing with temperature resistant coatings. This is the silicone group resins derived from silicon linked to carbon complexes. Essentially, these compounds represent links between the inorganic ceramics and the organic coatings and give a new order of magnitude to resistance to heat and certain other conditions.

The silicone coatings are supplied as solutions in aromatic solvents. They may be pigmented, and a white made with titanium oxide is unchanged at temperatures above 400 deg. F. The silicone coatings are also very resistant to fruit juices, iodine, ink, and boiling water. Silicone finishes have stood up to 100 hours in 3 per cent caustic at 100 deg. F. with only slight loss in gloss. They have also withstood 3 per cent hydrochloric for 100 hours, 3 per cent acetic for the same period, oleic acid at 212 deg. F., and hot mineral oils for the same period.

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No color buffing • No re-cleaning • No re-racking • No special solutions. Merely add to cold nickel solution, still or mechanical • No extra equipment.

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Illustration shows unbuffed deposits before and after Lustrebright.

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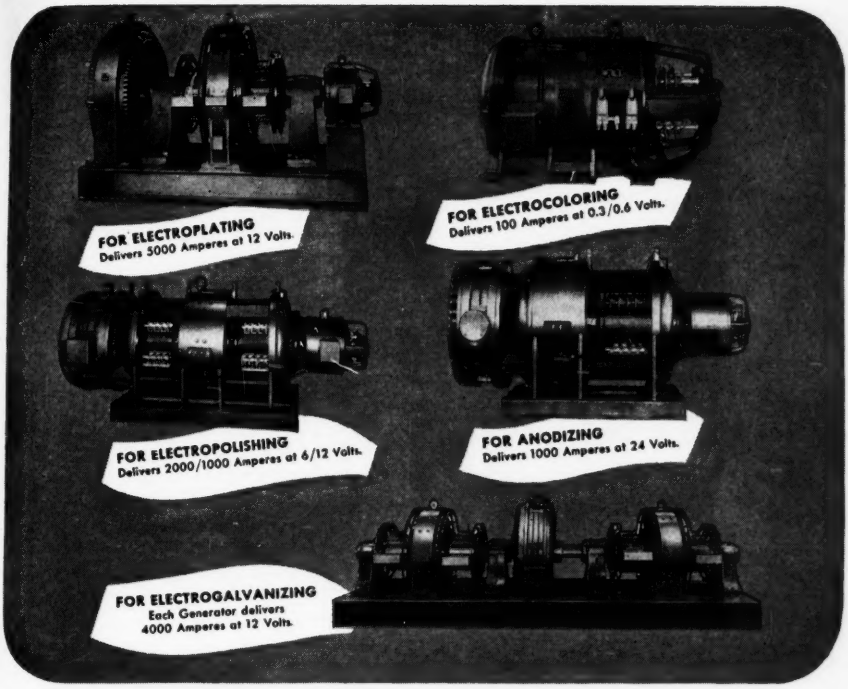

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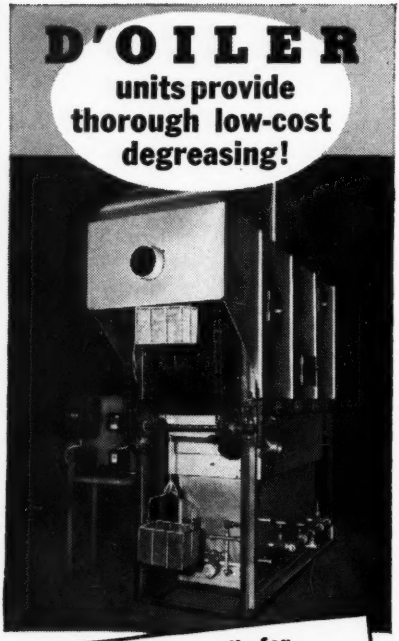

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Silicone coatings require more baking than the usual run of industrial finishes, an hour at 350 deg. F. being typical. The present high cost of the silicones restricts their use to places where their intrinsic integrity to heat and chemicals is absolutely required. However, the cost will decrease as production increases, and the resistance to chemicals and weathering connected with these finishes is certain to make their use more wide.

* * *

Aluminum Can Be Electropolished

FINISHING engineers concerned with the production of bright reflective surfaces on aluminum should remember that this metal responds favorably to electroplating treatments. According to J. F. Mason of Reynolds Research Laboratories, electropolishing of aluminum may be accomplished by means of either the sulfuric-phosphoric acid bath patented by Battelle Memorial Institute, or by the Alzak process, patented by the Aluminum Company of America, or by the Brytal process patented by the British Aluminum Company (see "The Iron Age," September 5, 1946 and also forthcoming book on Aluminum Finishes by above author to be published by Reynolds Metals). In these electropolishing processes, the work is made the anode and metal is removed selectively under conditions of anodic polarization. The grains of the metal are not distorted, but rather a highly polished surface is obtained. A very thin oxide film is also produced on the aluminum surface, but this film is usually reinforced by subsequent anodizing treatments in the usual electrolytes to obtain a clean, hard, temperature and exposure - resistant coating.

Battelle Process. The process developed by the Battelle Memorial Institute is a practical method for obtain-

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ing high reflectivity on suitable aluminum sheet. The procedure consists of first cleaning the work and then rinsing it in cold water. Following this, the parts are immersed in a bath consisting of 40 per cent sulfuric acid and 60 per cent phosphoric acid for about 15 minutes. Glycerine (0.1 per cent) is sometimes added as a buffer. The bath temperature minimum is about 140 deg. F. with current densities of 100 to 150 amp./sq. ft. It is reported that about 0.0002 inch of metal is removed by this treatment, which produces a thin, transparent, glossy oxide coating with high reflectivity factors.

Alzak Process. The Alzak process patented by the Aluminum Company of America utilizes anodic treatment at a current density of 10 to 20 amp./sq. ft. and a 2½ per cent solution of hydrofluoric acid. The bath is maintained at a temperature of about 85 deg. F., under which conditions a processing time of 5 to 10 minutes is required. The surfaces so produced retain their reflective properties under mild exposure conditions for a long time provided they are cleaned periodically. As previously noted, the reflecting surfaces produced by both the Battelle and Alzak processes are usually given a full oxidizing treatment to provide surface protection. A solution of 7 per cent sulfuric acid has been found to be particularly well suited for this purpose. Sealing of the oxide coating is also desirable and may be carried out by immersing the part in water at 180 to 212 deg. F. for 10 minutes.

Brytal Process. This process, which is patented by the British Aluminum Company, involves treating the work anodically in an alkaline solution consisting of 15 per cent by weight of sodium carbonate and 5 per cent by weight of sodium orthophosphate in water, maintaining at all times a solution pH of at least 10. In carrying out the process, the work is first pickled before any current is passed. Following this a direct current of about 10 to 15 volts is applied, giving a current density of 20 to 30 amp./sq. ft. The time of treatment is 10 to 15 minutes with a bath temperature of 170 to 185 deg. F. Following this phase of the treatment, the parts are removed from the bath, thoroughly rinsed, and then anodized in a 5 to 40 per cent by weight solution of sodium bisulfate to produce a clear, transparent, protective film. The temperature of the latter bath is maintained at 70 to 120 deg. F., and a current density of approximately 5 amp./sq. ft. is used for a period of 10 to 15 minutes.

Aluminum reflecting surfaces produced by these three methods possess good corrosion and abrasion resistance, are resistant to fingermarking, and will withstand temperatures up to approximately 400 deg. Fahrenheit without crazing.

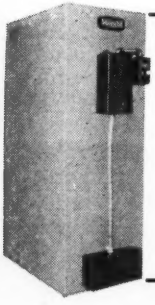

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TABLE I

ALLOY	Maximum Temperature in °F. for Total Baking Time of ½ Hr.	1 Hr.	2 Hr.	3 Hr.
Zamak-2; A.S.T.M. Alloy XXI; S.A.E. No. 921	325	275	250	250
Zamak-3; A.S.T.M. Alloy XXIII; S.A.E. No. 903	325	375	325	300
Zamak-5; A.S.T.M. Alloy XXV; S.A.E. No. 925	425	375	325	300

Safe Baking Temperature for Zinc Die Castings

MOST modern finishes are either force dried or baked, which adds to their durability and adhesion. It is only natural that since zinc is a metal of relatively low melting point, some attention must be given to the possible influence of high baking temperatures on the metal. However, it is true that the problem of maximum safe baking temperatures for zinc alloy die castings has to a large extent been eliminated through the development of synthetic resin finishes which can be baked to suitable hardness in one hour or less at temperatures between 200 and 300 deg. F. or in 15 minutes or less at higher temperatures. Under such conditions, the only difficulties often encountered in the finishing shop are an occasional blistering of the castings themselves due to the expansion of gases in porosities near the surface or the development of blisters in copper-nickel-chromium electrodeposits which are frequently applied in conjunction with organic finishes. Restrictions in temperature imposed by the former may often be minimized by changes in the die-casting die. Changes in cleaning practice in copper-nickel-chromium plating to take advantage of as short a time in the alkaline cleaner as is possible will frequently allow for the safe use of the higher portions of the baking temperature range.

Nevertheless, there are cases where organic finishes are to be applied over suitably prepared surfaces where it is desired to use a finishing system already available which involves temperatures higher than those above. While a high degree of stability of dimensions and properties has been achieved in the modern zinc alloys under conditions of service at temperatures between room and about 212 deg. F., it is known that this stability can be destroyed by exposure of the castings above certain minimum temperatures in baking. To prevent this undesirable effect, which is completely independent of blistering of the casting or of copper-nickel-chromium deposits, it is necessary to observe the restrictions on temperature and time given in Table I prepared by the New Jersey Zinc Company.

"Kellogg-American 'On the Spot' Air" is the title of a four-page illustrated bulletin now being issued by the Kellogg Division, American Brake Shoe Co., Rochester 9, N. Y. The bulletin describes a method for locating air compressing equipment at strategic points close by the work to be done in the various departments of a plant. Copy free upon request.

Newcomb-Detroit Spray Booths. A 16-page catalog describing its water tube spray booth has been published by the Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich. The catalog covers the working principle and presents complete specifications of this paint spray booth. The descriptive matter is supplemented by numerous photographs and drawings, including installation views. Copy free.

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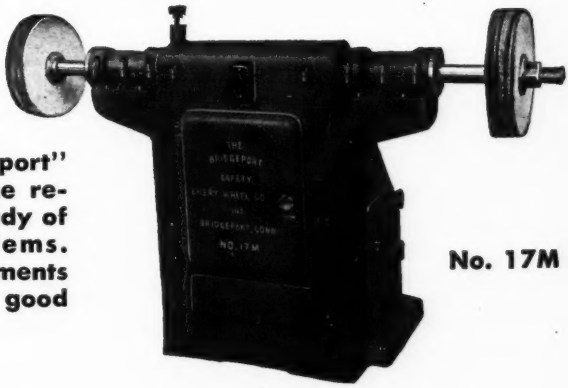

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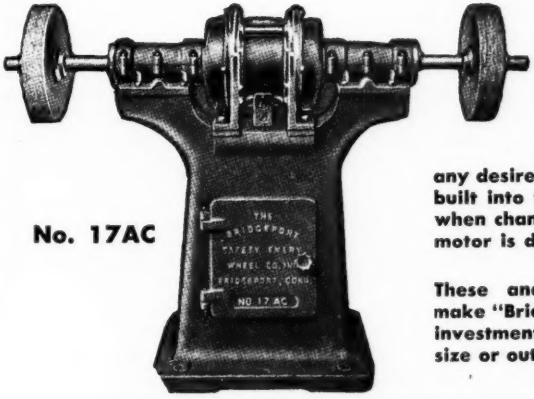

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Large diameter, high carbon steel spindles, accurately ground and fitted, run on four sets of dust-proof ball bearings. No. 17M has motor mounted in base, which permits any desired speed. A spindle locking pin, built into this machine, locks the spindle when changing wheels. In the No. 17AC, motor is direct-coupled to spindle.

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Barrel Finishing of Metal Products

Part 4—Factors in the Use of Soap

By H. LEROY BEAVER
Barrel Finishing Consultant
Lansdale, Pennsylvania

IN resuming the series of discussions on the barrel finishing of metal products, our readers will recall that we stated that, while we had our program of papers with the phases to be covered pretty well defined, that should anything occur that would merit a change in the program or some subject become more pertinent, that the schedule would be changed. Such a change was warranted in the discussion of the past month regarding the reclamation of steel barrel finishing materials and such a situation exists for the December discussion for we have had more than an ordinarily large number of requests to say something about soap.

Due to our own activity in this particular field, we have sufficient reasons to know just about what is the current situation as well as what has gone before. Never in the history of soap production in this country has the average soapmaker faced so many problems, and with the search for suitable raw materials in the form of fats and oils, he has been further handicapped by price ceilings that in too many cases has caused him to do little better than to trade dollars with his customers if indeed he could do that well. Now with the lifting of price ceilings and with soap in shorter supply than at any other time in the history of this country, prices are bound to advance and very materially too, and for that reason we hope you will find this discussion most pertinent. In it we will try to point the way to a more effective use of soap that will give you more satisfactory end results as well as provide for a saving in production costs due to the use of smaller quantities with each load of work coupled with the more intelligent application of soap in the process.

First then, we want to ask you a most pertinent question: **"What do you know about your water supply?"** If your answer is that you know only that it comes from a tap or bib or faucet or whatever you elect to term the outlet and that it is supplied by the municipal water works, then it is very doubtful whether you are using soap intelligently. The very first thing we want you to do is to get into contact with the chemist of your local water department.

Don't use the telephone but write a letter and ask him to give you a current analysis of the water supplied to your plant. Ask him whether there is anything unusual about it. How does it test for hardness and to advise

you the number of grains of hardness to each U. S. gallon. Then, if it is hard water, and it will most likely be just that at least in some degree, ask him to recommend to you the simplest and least expensive water softening medium that you can use to reduce the water from whatever its hardness might be to zero hard or soft water. You will find by far and large that the chemists of any municipal water department are most helpful and cooperative people. We have had occasion, when in strange territory on research surveys, to make innumerable telephone calls asking for information and it was always promptly forthcoming to us, a total stranger, and we believe it will be more so in your own case, you being a customer.

Now you will ask the question, "Well, what is it that causes water to be hard?" The answer to that one is not too difficult for it will be found that generally speaking water hardness is caused by the presence of an average of two parts of calcium to one of magnesium. And what does that calcium and magnesium do that affects the soap used and the quantity required to be used? Well, any soapmaker will tell you that when you use a normal 42 titer soap, which is most generally a stearate of sodium, that unless you normalize your water with some alkaline agent, it will require two ounces of soap for each grain of water hardness per one hundred gallons of water to effect a reduction to zero hard or soft. Now suppose we just examine this a bit and see what happens on a single barrel load of work, using, as an illustration, a 30 x 16 barrel and a water charge of ten gallons. If your water, for example, is 16 grains hard per gallon and you use ten gallons for each barrel charge, you will find that to undertake to use soap as the normalizing agent you would need to add 32 ounces

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of soap to each one hundred gallons of water or 3.2 ounces to each ten-gallon barrel charge. Keep in mind that none of this is used as lubrication but simply as a water softener. You have probably been paying around 18c per pound for soap flakes and this price will most likely go up at least to 24c to 28c per pound, depending on the grade and actual soap percentage. The problem for your decision right here is whether you want to use soap as a water softener at these prices or whether you want to use some simple chemical. Trisodium phosphate or ordinary borax are effective and there are any number of prepared water softening agents available, many of which you can easily obtain. Most of you have supply men calling on you regularly. Ask them whether they can supply the medium suggested by the chemist of your water department or in lieu of that some comparable material that would be equally effective.

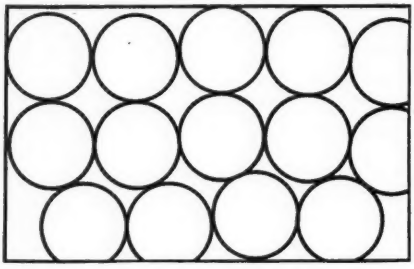

Fig. 1—Froth or Foam

And now we come to something else and it also has to do with water and soap. Sometimes we have no doubt you wonder why the parts coming from your barrels have a, shall we say, dull and listless look. We know about that too, and the cause of it is most generally a film of insoluble calcium or magnesium soap that is impossible to rinse clear and over which you can neither successfully deposit a metallic coating nor lacquer coating with any assurance of permanence.

The appearance of a newly purchased lot of polished steel burnishing material is a brilliant and limpid silvery sheen. As the material is used in the barrel along with work, soap and water, it becomes duller and duller and in most barrels has more the appearance of lead shot than of steel material. You simply don't get the best results with material that looks anything like that. The cause of the dull apperance is that same coating of insoluble lime or magnesium soaps. Our suggestion here is that you put this squarely up to, not just the supply salesman as such, but the sales engineer who calls on you and make it pretty plain that what you want is an addition agent to your barrel burnishing soap solution that will provide for sequestration of both calcium and magnesium and that will prevent the formation of these unwanted films, and better still if he can do it, something that will slowly but effectively dissolve such films if they have already formed on the surface of the burnishing material itself. There are many such materials available, and to undertake to list them would require a sheet about as long as the average arm.

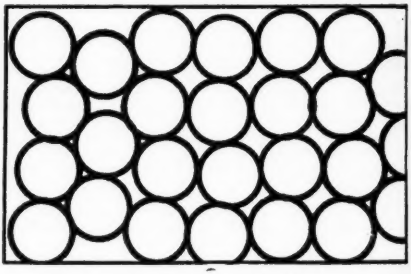

Fig. 2—Suds

Now let us assume that you have faithfully done all of the above things

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PENTRATE PENTRATE PENTRATE PENTRATE PENTRATE

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PENTRATE PENTRATE PENTRATE PENTRATE PENTRATE

we have suggested and that you have saved some soap by using in its stead a simple water softening medium, which brings us right down to the barrel itself, and back we go to water. How much water do you use to a barrel charge? Do you follow the hide bound recommendation to cover the entire surface of material and parts with water to a depth of either one or two inches as the case may be, toss in two ounces of soap, slap on the cover, and set the barrel in motion? That recommendation never made sense

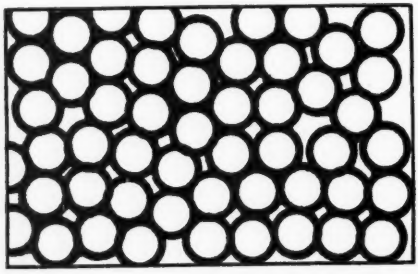

Fig. 3—Lather

even the first time it was made and it does not make sense now.

This current discussion has to do solely with the conservation of soap and the saving in operating costs so our suggestion is that you do just this: Instead of charging your barrel with a hose, use say a two-gallon bucket and add water until it comes just to the surface of the mass, taking careful count of exactly how many gallons you have placed in the barrel. If it should chance to be ten, then just empty the barrel and add only five gallons of water for your charge. There is no point in saponifying ten gallons of water when five will completely suffice.

Once you have made this reduction you are ready to add your soap charge. Two ounces may do quite well, we don't know, but we do know that in studying barrel after barrel in its operation we have learned that we can divide a soap impregnated water solution in what we shall call three degrees, and we will go even further than that and try to give you a few sketches to clarify just what we are trying to convey.

Let us now examine Fig. 1 marked "Froth or Foam." Note that the bubbles are large and that the walls are very thin. This is characteristic of the lubricating soap solution that you would secure when you use the proverbial two ounces of soap to a barrel charge of ten gallons of water. Scoop up a handful of this froth or foam and observe it carefully and you will see it start to disintegrate and go to a state of complete collapse in only a fraction of a minute. This is what is designated as a "falling suds." The reason that it is a falling suds is because the proportion of soap to water is too small and as a consequence even the churning of the barrel is unable to produce a suds of any stability. True, it will provide a froth or foam but the lack of a proper proportion of soap to water will cause the sidewalls of the bubbles to be so frail and thin that they will not even support their fellows in the mass, hence the entire head of froth collapses.

You understand, of course, that the purpose of carrying a stable head of soap in barrel finishing is so that all residual soil removed from the parts in process may be held in suspension until completion of the operation when they can be rinsed away, but when the soap solution is so weak that it produces only this froth or foam or perhaps better expressed, only a "falling suds," then you may be sure that such residual soil will be immediately redepositied on the surface of the parts as well as the burnishing material—a thing not so different from redeposited soil in the dragout from a cleaning solution. To correct this condition

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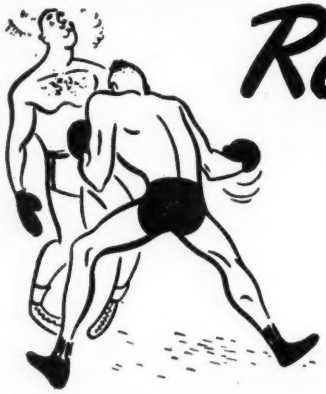
PARKER PRODUCTS CONQUER RUST

means, of course, to add more and more soap, but we are discussing the conservation of soap and most certainly not the dissipation of a material already in too short supply.

Now let us turn to Fig. 2 which we have marked "Suds." You will note that the bubbles that compose it are somewhat smaller in size and have heavier side walls than in Fig. 1. It is the type of lubrication that when you scoop up a handful it will remain stable for perhaps two minutes and then like the froth or foam start to rapidly disintegrate. In either case the froth, foam and suds will simply leave your hand wet without any slippery feel that would indicate proper lubrication. It is indicative of a condition where from three to four ounces of soap are used with a ten-gallon water charge and still do not provide for adequate lubrication, and both of these conditions are generally present where soap is sought to be used as a water softener and burnishing lubricant.

We now come to Fig. 3 which is marked "Lather." You will note that the bubbles here are much smaller in diameter and with decidedly heavier sidewalls. This means that with water that has been first reduced to zero hard and then the barrel charge reduced to just one-half that we get a firm and stable lather. We have designated it as lather because the comparison we want to convey to you is something like a shaving lather that you would use on your face. You will grasp the point more quickly we think if you try to imagine that you have brushed a coat of lather on your face preparatory to shaving but before you can get your razor stropped the lather has disintegrated and a few stray streams of just plain water are running down your neck. The stabil-



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NIAGARA METAL PARTS WASHERS

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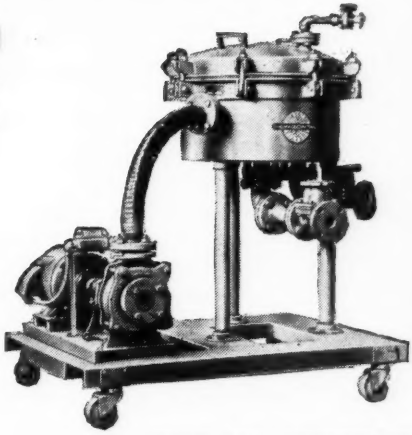

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HIGH QUALITY FILTRATION COSTS NO MORE

ity of your burnishing solution should be such that it will remain stable until the entire load has been run from the barrel onto your unloading tray, for in the rapid rinsing operation that follows all of the residual soil held in the soap mass is rinsed away.

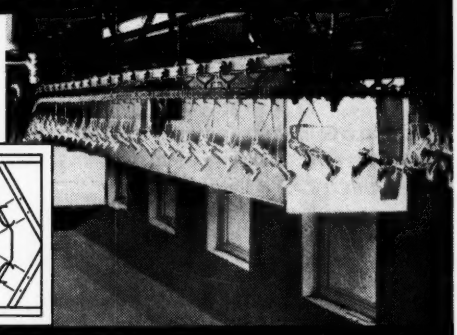
Watch the unloading of the average barrel and you will note that first will come a deluge of white foamy suds almost invariably followed by a stream of dirty dark slate colored water. Here is your certain indication that too little soap has been used in proportion to the water charge for in an adequate barrel finishing operation there should be no "free" water in the barrel at all and the lather should permeate the entire mass clear to the bottom of the barrel, and when the barrel is emptied the suds should run white throughout.

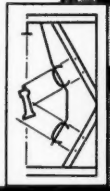
Just how much soap will be required to produce the stable suds that will remain stable until the barrel is completely unloaded and the mass ready for rising we do not undertake to say. It will depend on the character of the soap as well as just how effectively you have normalized your water supply. Rather look at the matter in this way. Ten gallons of unnormalized water requires 3.2 ounces of soap for normalizing alone. Then, if 2 ounces would suffice for lubrication, that would total at least 5.2 ounces and still leave considerable doubt as to whether you were getting adequate lubrication, for it most likely would require at least four ounces in addition to the 3.2 ounces required for normalizing, or the securing of a stable lather that would stand throughout the unloading period. Use only sufficient soap to produce the stable lather and this may require several experimental runs, starting with one ounce per charge then one and one-half ounces, which will probably suffice.

Not so very long ago we had quite

Not 30 minutes---But 8 minutes
TO DO THIS PAINT BAKE JOB!

SCENE—The Regina Corporation, Rahway, N. J.
PROBLEM—To bake white enamel finish on new type precision-built can openers in shortest possible time . . . and avoid discoloration.
HISTORY—Tests in conventional ovens showed 30 to 40 minutes required.
WHAT JENSEN DID—Designed and built special ceiling-mounted "dual-heat" infra-red oven . . . with unusual contour . . . employing rows of lamps set at criss-cross angles.
RESULT—Baking time cut to 8 minutes. All nooks and crevices of parts baked equally. Absolutely no discoloration.





JENSEN SPECIALTIES, Inc. JENSEN 9331 FREELAND DETROIT 27, MICH.
DESIGNERS and BUILDERS of "DUAL HEAT" INFRA-RED OVENS - STANDARD and SPECIAL CONVEYORS

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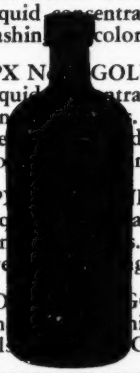

24K GOLD CONCENTRATE
Liquid concentrate containing gold with conducting salts used for flashing coloring articles with a 24K finish.

SPX N GOLD UNDERCOAT
Liquid trate containing gold with other metals and suitable con . Deposits are somewhat harder than fine gold and are dercoat on brass, copper, silver and soft soldered wo nal finish.

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Lic ate containing gold with other metals and suitable cor . Deposits provide attractive, uniform pink color ove ge of operating conditions.

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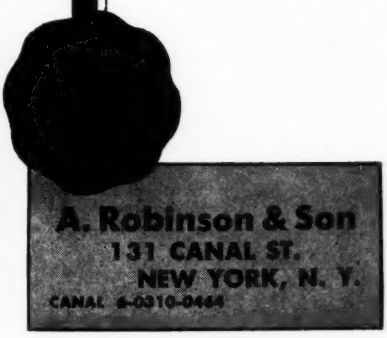
Th ide salts are made from the highest quality chemicals Government Treasury gold.

OTHER PRODUCTS
In addition to the products mentioned here, ON makes a complete line of gold concentrates that various colors to meet individual needs.

ROBINSON'S solutions and salts are bottled sizes and weights to meet individual needs.

In comparing prices—remember ROBINSON d by the troy ounce (31.103 grams)—not avoirdupois grams.)

The certified gold content of all Robinson's products is plainly marked on every label.



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Gold Plating Solution ( )
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an extended conversation with a German technician, now a naturalized American citizen. He had had a broad experience in barrel operation in Germany principally with D. W. F. (Deutches Waffen und Munitionen Fabriken) which, literally translated, would mean German Small Arms and Ammunition Manufactory, and he laid great stress on what he termed the "schaum" which also translated would mean froth, lather, or foam. It was also his studied conclusion that there should be no "free" water in the barrel during the burnishing operation or in the subsequent unloading period. It is equally true that in the operation of the Tahara silver burnishing machines which represent the highest development in American barrel finishing practice, the lather permeates the entire burnishing mass with no "free" water.

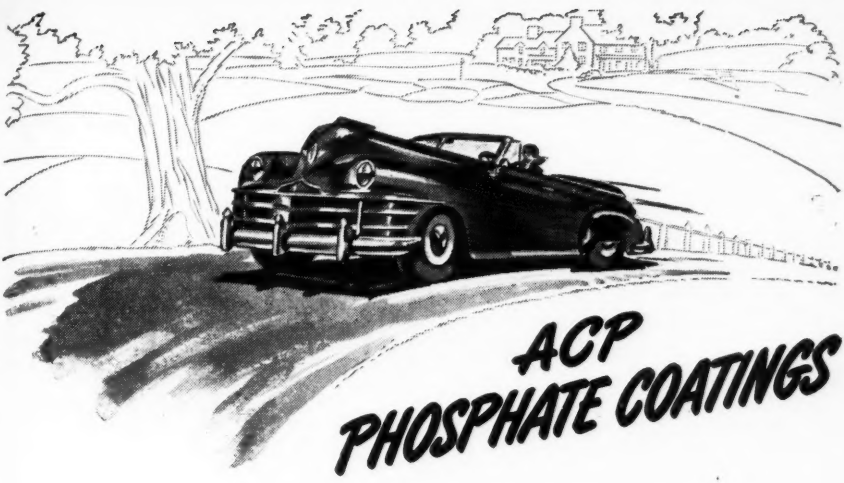
It is hoped that by following this outline you will be able to both effect a saving in the amount of soap used, as well as to very materially improve the finish of the parts coming from your barrels.

"Rust-Oleum Stops and Prevents Rust" is the title of a descriptive catalog issued by the Rust-Oleum Corp., 2425 Oakton St., Evanston, Ill., outlining the qualities of the company's rust preventive products for industrial, railroad, marine, farm, and general uses. The catalog analyzes the rust preventive requirements of each of these broad fields, with complete descriptive data presented on uses, applications, and engineering specifications of Rust-Oleum.

Problems of scientific rust control, together with directions for the use and application of Rust-Oleum, are presented in the first section of the catalog. Specifications, listed topically in the second section, are organized for easy reference through the use of 39 color cards, augmented by 12 color panels of machinery and implement finishes. These cards show the various colors in which Rust-Oleum is obtainable. The third section of the catalog outlines recommendations, and the inside back cover contains a handy index of products in the company's postwar line.

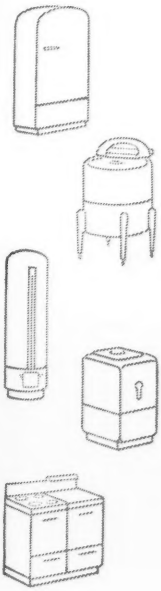
Copy of the catalog is available free to mechanical executives addressing requests on their company letterheads.

IN almost two years, The Udylite Corp., Detroit, Mich., has produced and shipped 100 large fully automatic plating machines of the type illustrated herein. They have been purchased by platers in 15 different states from coast to coast for use in 14 different processes in the production of a very wide range of plated parts. The machine shown is loaded on a 50-foot car.



ACP PHOSPHATE COATINGS

Positive Protection For Painted Metal Surfaces



ACP Phosphate Coatings produce an excellent paint-bonding surface on metal parts and provide a foundation for a lustrous and lasting finish. There are various types depending on the kind of metal, its condition and the purpose for which it is to be used as well as the equipment facilities of the manufacturer.

Cold **SPRAY-GRANODINE** in a short spray time forms a uniform, smooth, zinc phosphate coating — a superior base for lustrous, enduring paint finish. Cold Spray-Granodine is of special interest to fabricators of automobile bodies, fenders, refrigerators, cabinets and in general for proper preparation of sheet steel products for *durable, lustrous finishes.*

DURIDINE *simultaneously cleans and deposits a thin, tight, close-grained phosphate coating* on ferrous surfaces which provide the proper surface preparation for durable paint finish. The Duridine process is simple, economical and effective. Present spray washer installations of mild steel are adequate.

THERMOIL-GRANODINE used in an immersion process creates on steel an oil-absorbing, paint-bonding, crystalline coating of iron and manganese phosphate, integrated with the base metal. Treated surfaces, when oiled or painted, provide excellent protection against rust. Thermoil-Granodine furnishes excellent rust protection for tools, nuts, bolts and unpainted replacement machine parts.

ACP Technicians will gladly consult with you and recommend the products and processes which will most efficiently meet your requirements.

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

Defeat of Metal's Enemy

CORROSION

By PROFESSOR A. M. LOW

Author of "The Future" and "Science Looks Ahead"

ONE of the most pressing industrial problems constantly under investigation is that of corrosion in metals, and it is to the credit of Britain's researchers that wartime progress made in this particular branch of sientific work gives reasonable hope of still greater success in combating the economic losses caused. Broadly speaking, there are four main types of corrosion. These are caused by atmosphere; by sea water and sea air; by other corrosives than air and water, and in connection with chemical manufacturing and process industrial equipment.

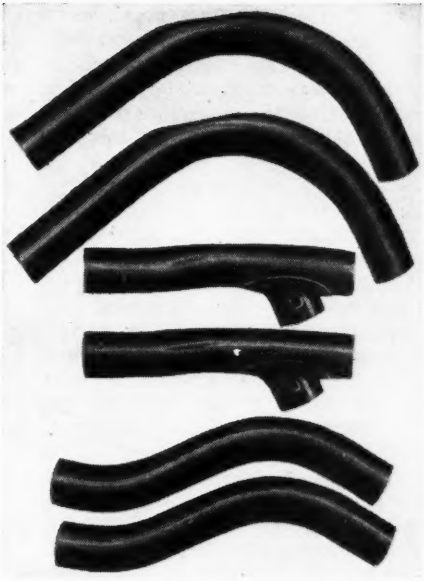
Probably the best known example of atmospheric corrosion is the rusting of iron. Corrosion from sea water and sea air is suffered by ship's parts and cargoes, and, under the equipment heading, we find attacks by lubricating oil on engine bearings, the damage to utensils by food during cooking, and the effects of alkali or acid in the water combined with heat in steam boilers.

Reasons for metal corrosion have been a vexed question for many years. The most generally accepted theory, however, today is that each individual case of corrosion implies, in a lesser degree, the flow of electric current similar to the current flow in a battery and accompanied by the exhaustion of its plates. The non-homogeneities of a metal surface act like small electrodes, the metal itself forming another electrode in contact with them, but differently charged. An electromotive, or driving force, is also necessary to activate the flow of ions from the metal to the attacking solution.

Each metal has a different potential or "driving force," and metals are now listed in what is called an "Electromotive Force Series" according to their relative tendency to dissolve in solutions of their salts. The table is useful when dealing with practical corrosion problems for it indicates metals most quickly attacked by atmospheric corrosion and others more slowly affected. The order shows the approximate relative corrosion resistance of specific metals to chemicals in general.

A type of corrosion which causes serious trouble in metal work is that known as "galvanic." This is the corrosion of one metal when it is in contact with another in circumstances

MOTORCYCLE EXHAUST PIPES MADE HEAT AND CORROSION RESISTANT WITH SILCO GLASS - BASE SPRAY COAT



SILCO, a new baked finish imparts extremely high resistance to corrosion, abrasion and impact, and withstands heat up to 1000° F. It is, therefore, an unparalleled finish for exhaust pipes, mufflers, stoves, heaters and thousands of other steel and brass products that must be exposed to disintegration. As SILCO is available in many colors and shades, it is the ideal finish where attractiveness and durability are prime requisites.

Easy to work. Spray it on with your regular equipment and dry at 200° F. Then bake in any industrial oven at 350° F. Send for samples. They will amaze you!

BLACK-MAGIC-- A deep-penetrating, 1-bath oxide black that gives all steels except stainless a dense black that won't rub off. Very flexible, forming may follow processing. Also a fine rust inhibitor and a bond for paint and lacquer. Chemical reaction at 300° F. There are also BLACK-MAGIC baths for zinc, copper, brass and cadmium. Send for samples.

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MODERN METAL FINISHES
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BLACK-MAGIC OXIDE BLACKING SALTS
WITCH-DIP & WITCH-OIL FINAL FINISHES

SILCO *Glass-Base* PROTECTIVE COATING
HEAT TREATING SALTS. CLEANERS. ETC.

N. Y. CITY: Lacquer Finishing Co.. Inc., Clifton, N. J.—C. D. Hamilton, Fayetteville, N. Y.
CLEVELAND: Universal Paint & Varnish Co. — PHILA.: Albert Printz, Germantown
ST. LOUIS: G. S. Robins & Co. — DALLAS, TEX.: Texokana Supply Co.
LOS ANGELES: Barber-Webb Co. — OAKLAND: Geo. A. Kushman Co.
CANADA: Marine Power, Ltd.

where, if alone, the first metal would not suffer corrosion. Reference to the Electromotive Force Series shows the metals tending to speed up corrosion of any metals above them when in contact with a corroding solution, while the metal lower on the scale will be practically unaffected.

British laboratory research into these problems has been directed in three main directions to strengthen the resistance of metals to corrosion—firstly, in developing and using new alloys specially resistant to atmospheric or chemical attack, secondly, in finding and testing metallic or non-metallic coatings to preserve the metals, and thirdly, by better service conditions in individual cases.

In the field of atmospheric corrosion, the rusting of iron and steel has been tackled with varying success by tinning, chromium plating, painting, galvanizing, and enameling. Iron is alloyed with nickel or chromium, or both, to produce alloy steels and stainless steels. The first is less liable to rust than ordinary steels, and the latter practically rustless or non-rusting under usual conditions.

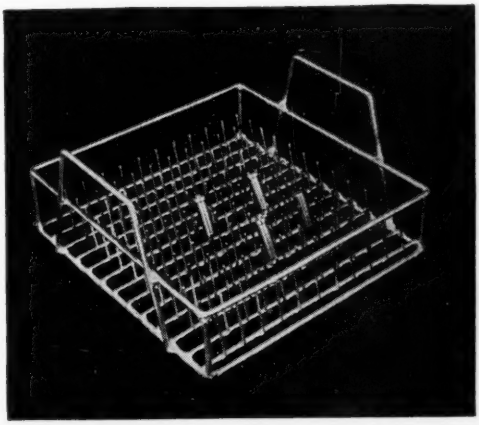
Better results from painting, the most general form of metal protection, also have been obtained. New resin lacquers, metallic coatings, and new chemical treatments for zinc-coated steel have all been taken in the stride of the rapid wartime advances contributed by British workers. There are novel vitreous enameling steels and enamels that allow application of white or one-coat finishes directly to the base metal. They are more than equal in protective power to former coatings, are deep so that scratches are unimportant, and last longer. Another product of great interest to industrial manufacturers is an aluminum-coated sheet of strip steel combination recently developed. This has the corrosion resistance properties of aluminum

"MGC
Plating Equipment
is Really Smooth"
...the Results will Convince You
Buffer and Grinder
2000 Ampere Plating Generator
750 Ampere Plating Generator
No plating problem is too large or too small for you to profitably use MGC plating equipment. In the complete MGC line of platers, you will find 100 ampere generators for small job shops — and 2000 ampere generators for large job shops and factories who need production plating of nickel, copper, brass, cadmium, chromium, etc. Features include special windings, ball bearings, compact single unit design—with longer life, maximum efficiency and economy. MGC Buffers and Grinders are made in several models for all plating applications. Write for details on the complete line.
Motor Generator Corp., Box PF-126, Troy, Ohio (Division of Hobart Brothers)
MGC
"One of the World's Largest Builders of Electric Generators"

ROLOCK
PROCESSING CARRIERS

HERE is a good example of how Rolock custom-built processing carriers lower hourly costs, conserve valuable time and make handling of metal parts easier for the specific job.

This tray was designed for a shop which required a large quantity of stacking pin racks for degreasing and storing lip stick cases. The customer's brass sample was costly . . . complicated. Rolock simplified the design and substituted galvanized steel . . . adding the feature of inclined pins to minimize contact with the inside of the cases.



Rolock carriers always have the maximum resistance to exposures and abrasion.

Catalog on request.

ROLOCK, INC.

1400 Kings Highway East, Fairfield, Conn.

added to the strength of steel.

Corrosion from sea water has been a major wartime problem and has led to many important developments in metal safeguarding. It has been essential that war weapons shipped and taken over land to all parts of the world should arrive free from rust or other harm. Various treatments have been evolved from improved slushing oils to chemically applied coatings for small parts. In one treatment, parts are dipped in a hot mixture of ethyl cellulose and then removed. The result is a smooth tight-fitting sealed wrapping for the part under treatment. Larger sections are put into loose bags containing a desiccant such as silica gel.

In this matter of combating sea water corrosion, copper alloys have been most useful with such materials as aluminum - bronze, the silicon-bronzes, and manganese bronzes. Nickel and its alloys, too, have been valuable, while the important property of gray cast irons for resisting sea water corrosion has made their use for marine propellers and similar parts almost universal.

In the industrial corrosion field, problems have been solved mainly by alloying rather than by surface coating. Cobalt - chromium - tungsten and the nickel-base molybdenum alloys are among the latest metals used to solve industrial equipment corrosion troubles. These alloys are dearer and not so easily worked as some less resistant materials, but they are more widely employed because of their resistance to chemicals and high-temperature oxidation.

Another method of treatment for bearings is the use of silver with steel backing, plating iridium and lead over the silver, the iridium then diffusing into the lead. Stainless steel, especially treated with titanium and columbian, and aluminum alloys containing zinc and magnesium are also used in the fight against corrosion, which costs millions of dollars yearly.

With regard to chemical equipment, aluminum and copper alloys or silver and platinum have been tested and found remarkably efficient. Tantalum, by virtue of its acid-resistant properties, and stainless steels containing molybdenum are also well to the fore. The use of glass vessels and glass piping is becoming increasingly general.

Designers, too, have been solving corrosion problems. In the case of salt-water condensers, for example, water velocities are now limited to suit the particular materials used, and, to combat galvanic corrosion, valve trim materials such a Monel are employed to protect important working parts.

Clean Spray Booths

Spray BOOTHCOTE on clean booth.
Paint peels off in sheets.
NO SCRAPING—SAVE TIME and LABOR
Trial offer 5 gal. $5.50 F.O.B. Buffalo
Used by 2000 leading manufacturers.
MONEY BACK IF NOT PLEASED.
Write for Circular.
HYGRADE FOOD PRODUCTS CORP.
HARRIS SOAP—BOOTHCOTE DIV.
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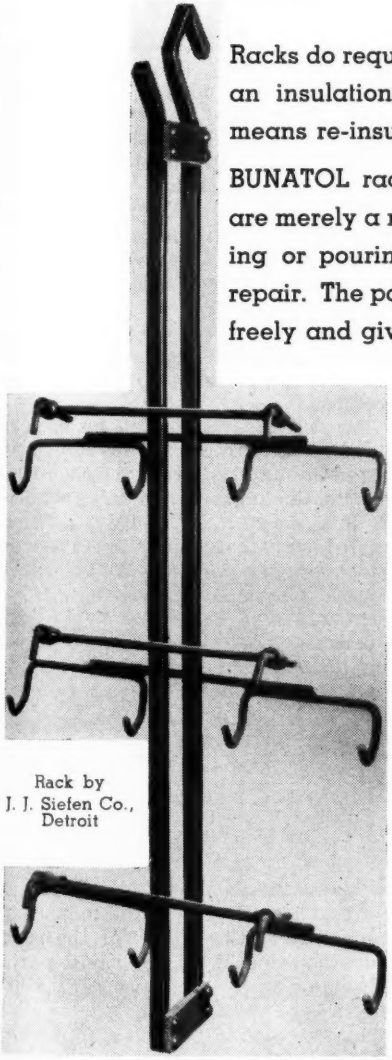
Norton 32 Alundum, an aluminum oxide abrasive, is fully described and illustrated in an attractive four-page bulletin published by the Norton Co., Worcester 6, Mass. Copy free upon request.

Easy to Patch



Rack by
J. J. Siefen Co.,
Detroit

Racks do require repairing and, unless you are using an insulation that is easily patched, each repair means re-insulating the entire rack.

BUNATOL rack insulation sticks to itself so repairs are merely a matter of cleaning the patch and brushing or pouring on new insulation to complete the repair. The patch makes a continuous film that rinses freely and gives perfect insulation.

BUNATOL is the low cost insulation for use on all types of electro plating racks. It's free dipping and requires a minimum of labor to apply. It has the toughness and resistance for long insulation life and a permanent flexibility which permits insulation of spring contacts.

May we send you complete information?

NELSON J. QUINN COMPANY
Toledo 7, Ohio

BUNATOL

PRACTICAL APPLICATIONS *of Modern Products*

Thickness Gage Saves $600 Monthly at Florence Stove Company

THE use of a General Electric Type B Thickness Gage to determine the thickness, and hence the degree of white, of the procelain enamel on stove parts at the Florence Stove Co., Kankakee, Ill. is saving the company $600 monthly by reducing the number of rejected parts and speeding up the enameling process.

The gage provides a double check on the thickness of the enamel. It is first used to determine the exact thickness which will give a desired shade of white, and the pressure control on an automatic sprayer is set to give just this thickness. Then, after a part is sprayed, it is checked by the gage before it is baked to make certain that the correct uniformity has been held. If the thickness is not correct, the enamel can be washed off and the part resprayed. This method has virtually eliminated rejects, according to George Grimes, superintendent of Florence's Enameling Department, and has greatly speeded up the enameling process.

The thickness gage can be used to measure the thickness of any nonmagnetic material from 1 to 1/10,000 inch in thickness which is applied to an iron or steel base. By placing a small instrument upon the surface of the coating, an operator can determine thickness from an indicating instrument which is not much larger than a dial telephone. The portability feature of the gage permits its use on several spraying lines at once at the Florence Stove Company.

Illustration showing operator using G-E Type B Thickness Gage

"Troxide" Facilitates Pickling of Various Parts

THE pickling tank shown in Fig. 1 herewith has a capacity of 400 gallons and is used by the American Thermometer Co., St. Louis, for the pickling of various types of small parts. This tank has been in use daily since November 1, 1945 with the original "Troxide" pickling solution, plus small additions to maintain a 6 to 7 per cent

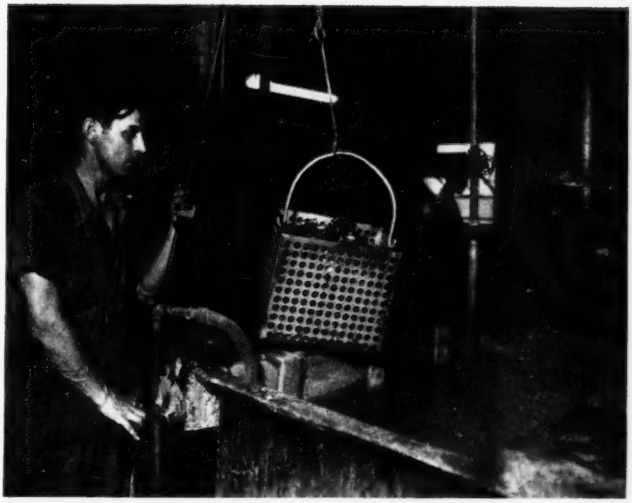


Fig. 1 — Mild steel thermostats being pickled at American Thermometer Co., St. Louis in a 400-gallon tank containing "Troxide" solution

acidity. Mild steel thermostats of various types are shown being pickled prior to cadmium plating. Pickling time averages 15 minutes at a temperature between 140 and 160 degrees F. Prior to using Troxide, the company used a pickling solution which had to be replaced every two weeks. Now, by using Troxide, the need for complete replacement has been practically eliminated.

Illustration Fig. 2 shows a pickling tank employed by the Churchward Co , New Haven, Conn., which has a capacity of 3,000 gallons. This tank is one of four such tanks installed in the plant, which include a pickling tank, rinsing tank, and two Parkerizing tanks. The mild steel parts shown being pickled are used in the manufacture of steel pleasure boats. Pickling is done with the aid of Troxide pickling agent for a period of 15 minutes, following which the parts are Parkerized 30 minutes. Between 350 and 400 tons of steel are pickled before the bath is changed.

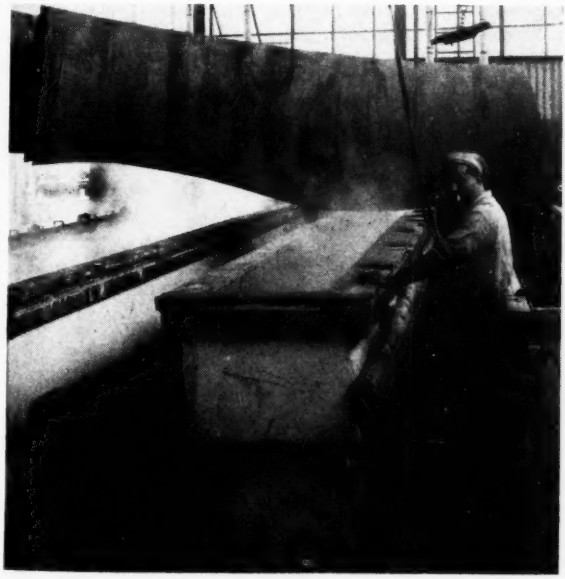


Fig. 2—3,000-gallon "Troxide" pickling tank used at Churchward Co., New Haven, Conn., to pickle mild steel parts

Fig. 2—The efficiency of the 36-inch Osborn Belgian horsehair brush shown here is best illustrated by the before and after appearance of the plate on its way to and from the brush. Note the thoroughness of the cleaning job which is done in a fraction of a minute.

●

Lithographic Plate Washer Processes 3,600 Pieces in 8 Hours

A UNIQUE lithographic plate washing machine which provides a cycle of washing, power brushing, and quick drying is now being used by the Addressograph-Multigraph Corp., Cleveland, Ohio, to a clean zinc Multilith plates. The machine is said to eliminate a former hand-sponging method and speed up the operation to an average of 3,600 plates in an eight-hour shift.

Believed to be the only one of its kind in operation, the machine thoroughly cleans the zinc sheets, which are 31½ inches square, in a three-step, assembly-line operation by means of a conveyor which carries the sheets first through a gravity-pressure water wash (see Fig. 1) and then over a wooden platform to a 36-inch No. 60 Belgian horsehair Osborn brush, which brushes surplus mud off the grain (see Fig. 2). From this point, the plates pass through a three-gas line drying cabinet which completely dries them in the fraction of a minute that it takes each plate to pass a 2-foot point on the conveyor line.

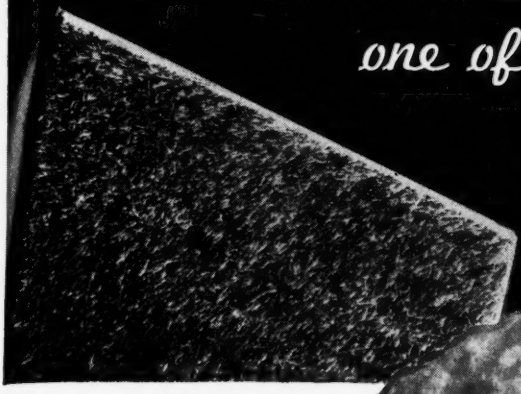
At the end of the line where final

Fig. 1—The first step in the Multilith plate washing process after the plates are properly grained is to place them on the conveyor shown herein which passes them through a gravity-pressure water bath that appears at right-center.

Synthetic Carpet

one of the many

SYNTHETIC FINISHES made with



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Applied to cloth, paper, glass, wood, metal, etc., as

SUEDE • MOHAIR • CARPET • VELOUR • VELVET • FELT

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Used in the auto, airplane, radio, electrical, phonograph, ceramics, furniture and many other industries for surfacing all sorts of materials to provide—
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Applied in various lengths and colors to wood, paper, cloth, metal, etc., the following effects are produced—
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Rayco Flock (uniformly controlled particles of cotton, rayon, hair) produces finishes of amazing variety, in any colors, on virtually any base material. Widely used in airplane, auto, furniture, camera and many other industries. Book shown below is your key to this "process of infinite possibilities."

Request Book:
"Surface Coating With Flock"

RAYON PROCESSING CO. of R. I. INC.

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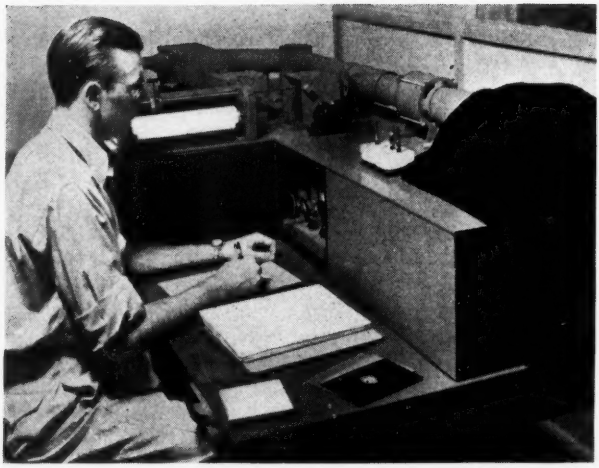

Illustration showing an operator making a test with the G-E spectrophotometer

inspection takes place, an operator detects any small amount of dampness that may remain around the outer edges of the sheets. Eight of the zinc sheets pass through the machine in 1½ minutes. The success of the entire operation is due to the fast drying feature, which is essential to prevent oxidation. The 36-inch brush used in the process is manufactured by The Osborn Manufacturing Company, Cleveland.

G-E Spectrophotometer Used to Match Color Samples at Pemco Corporation

A GENERAL ELECTRIC recording photoelectric spectrophotometer, an instrument which is designed to measure and record as curves on a graph over two million shades of color, is now in use at the Pemco Corporation, Baltimore, to simplify the matching of porcelain enamel and glass colors and provide a constant quality control check. The instrument is expected to save from two-thirds to three-fourths of the time required to match colors at Pemco using former methods.

By using the spectrophotometer, Pemco has established a library of over 1,000 color curves of known composition, representing every porcelain enamel and glass color produced. When a customer submits a sample color, it is analyzed by the spectrophotometer and the resulting color curve is matched as closely as possible with one of the curves in the library. An experienced color mixer knows what ingredients must be added to make both curves, and thus both colors, match perfectly. In this way, comparisons are made quickly and accurately, independent of the physiological factors which affect human judgment.

Operation of the spectrophotometer is simple, consisting of inserting the color sample and a standard in their respective holders, placing the recording paper on the drum, and selecting the correct recording speed.

Lacquer Selection Chart. A simple check chart of the properties of Unichrome Lacquers whereby the proper lacquer for a particular job can be quickly and easily selected has been prepared by United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y. Containing information based on severe laboratory tests, the chart lists 14 Unichrome Lacquers as to initial color, color retention, gloss, film hardness, flexibility, adhesion, and numerous other properties. Copy free upon request.

The name that makes news in industrial finishes . . . Pratt & Lambert-Inc.

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Industrial Finishes
NEW YORK BUFFALO CHICAGO
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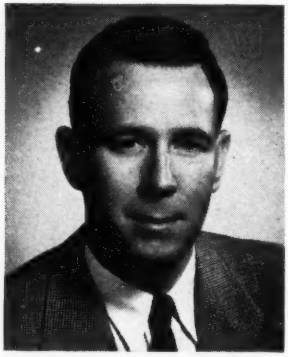
NEWS of the Industry

Kelite Sales Promotion Manager

Harry L. Smith, vice president of Kelite Products Inc., manufacturer of industrial cleaning materials, announces



T. W. Rawlings

the appointment of T. W. Rawlings as sales promotion manager. Mr. Rawlings will handle all sales promotion activities, including the working relationship with Kelite's advertising agent, Little and Company. He replaces Allen W. Schmidt who organized the department and who is now associated with the account executive staff of the McCarty Company, national advertising agents and counselors.

Having spent over 20 years in advertising and promotion, Mr. Rawlings was formerly connected with various departments and companies of General Motors in art and promotion activities and also conducted his own advertising and art service in Detroit. During the war, he served as a production illustration expert on B29 and jet-propelled aircraft and later was a designer and illustrator with Tivit Products Company, a Kelite subsidiary.

H-VW-M Expands Personnel

The Hanson-Van Winkle-Munning Co., Matawan, N. J., announces a number of additions to and changes in its technical, sales, and service staffs in an endeavor to aid the company in providing wider and better service to its customers.

Paul J. Lalonde has been transferred from chemical research activities to engineering service and development for the electrotypers' and stereotypers' industry. He is a graduate of Rensselaer Polytechnic Institute with a degree of Ch.E. and has had wide experience as a

Paul J. Lalonde

member of the technical staff of the Hanson-Van Winkle-Munning Company.

Dr. Otto Kardos has been assigned to the post of research electrochemist for the study of plating solutions. Dr. Kardos received his Ph.D. in chemistry from

the University of Vienna and served for a number of years as chief chemist of Galvapol in that city. Later he was engaged in the chemical and electrochemical fields in France and the United

Dr. Otto Kardos

States prior to joining the H-VW-M organization.

D. Gardner Foulke has joined the H-VW-M technical staff as a process electrochemist. Dr. Foulke received his B.S. in chemistry at Juniata College and an M.S. and Ph.D. at Rutgers University. Until recently he was director of the Analytic Laboratory of Foster D. Snell,

D. Gardner Foulke

Inc. He had previously had wide experience in the chemical and electrochemical fields, and is a member of the American Electroplaters' Society, The Electrochemical Society, the American Society for Metals, the A.S.T.M., and the American Chemical Society.

Library of Congress Offers Research Facilities to Jeffrey R. Stewart

The Library of Congress in Washington, largest library in the world, has placed private study rooms at the disposal of Jeffrey R. Stewart for the purpose of preparing the forthcoming revision of his book "The National Paint Dictionary." This third edition of the volume is being revised and brought up

Jeffrey R. Stewart

to date by a staff of experts under the direction and editorship of Mr. Stewart. It will contain approximately 5,000 words, several hundred illustrations relative to the paint and varnish industries, and will be released the latter part of 1946 or early in 1947.

Mr. Stewart is temporarily on leave of absence from the War Department while revising his book and prior to his service with the U. S. Government held a position as research chemist with the National Paint, Varnish and Lacquer Association for a period of six years. He has also been associated with the Du Pont Company and, more recently, with the British Purchasing Commission in the capacity of materials engineer. In addition, Mr. Stewart served for some time as a contributing and consulting editor of PRODUCTS FINISHING.

Royal C. McCurdy Joins Swenson Organization

Royal C. McCurdy has been appointed research engineer of Swenson Engineering & Manufacturing, Inc., Detroit, producer of infra-red ovens, conveyors, dip tanks, and spray booths.

A native Detroiter, Mr. McCurdy has

Royal C. McCurdy

been associated with the Detroit Edison Company for the past several years, where, as a research engineer, he assisted in the pioneering of the infra-red process. Graduating from the Detroit Institute of Technology as an honor student, he holds a bachelor's degree in electrical engineering and is a member of the Detroit Engineering Society.

Newark A.E.S. Open Educational Program

The Newark Branch of the American Electroplaters' Society announces the opening session of its 1946-47 open educational program. The first meeting is scheduled to be held on Saturday, December 14 at 2:30 p. m. at the Hotel Robert Treat, Newark, N. J. Supreme President Frank K. Savage, Kuehne Mfg. Co., Mattoon, Ill., will speak on plating room incentive systems. Frank C. Mesle, Oneida Ltd., Oneida, N. Y., will present a paper on silver plating, while Myron B. Diggin, Hanson-Van Winkle-Munning Co., Matawan, N. J., will give a talk on the purification of plating solutions.

A ladies' committee has arranged to entertain visiting ladies during the afternoon session. Following the afternoon educational session will be a Christmas party starting at 8:30 p. m. This will include a turkey dinner, entertainment, and dancing.

Joins Butcher Metal Plating and Polishing Division

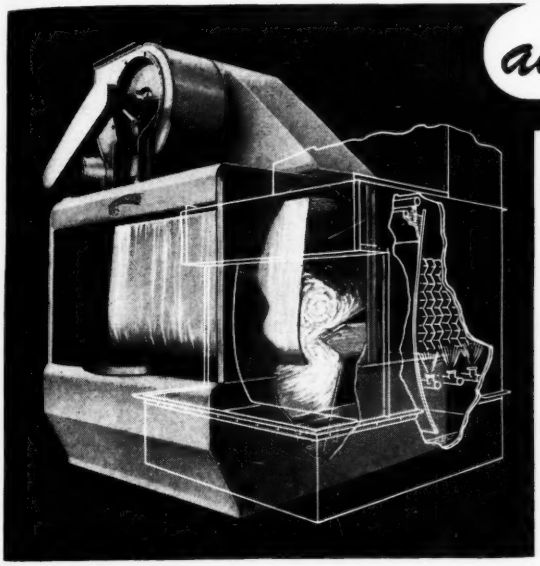
The L. H. Butcher Company announces the appointment of Myron Norman to the staff of the Metal Plating and Polishing Division in its Los Angeles office. Mr. Norman is a graduate of the Massachusetts Institute of Technology of '39 with a B.S. degree in electrochemical engineering. Following his graduation, he became associated with the Aerovox Corporation as assistant to the electrochemical engineer.

For the past six years prior to his connection with the L. H. Butcher Company,

Myron Norman

Mr. Norman was actively engaged with the Navy Department in electronics engineering on the East Coast. In addition, he later became project engineer in charge of certain phases of the development and production of infra-red signalling and detection equipment extending from the research and laboratory stages to the metal finishing in the final production.

MAXIMUM *Efficiency* *and* WHY



The advantages of the unique "Hydro-Whirl" washing and scrubbing action has relegated the conventional spray-type chamber to lightly-loaded applications only

This new and proven principle insures complete particle wetting by pulling the laden air through a heavy, rotating sheet of water. Combining this action with the adequate scrubbing secured as the air is further pulled through a winding path, affords the most efficient method of collecting paint overspray.

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HYDRO-WHIRL DUST COLLECTORS AND SPRAY BOOTHS—INDUSTRIAL OVENS, WASHERS AND VENTILATING SYSTEMS

Twins Serve the Same Industry

Edward F. and Edwin A. Stack, twins born in Chicago in 1913 and graduated in chemical engineering from Notre Dame in the class of '39, are now both serving the same industry. Edward is a technical sales representative for Mac-

Edward F. Stack

Dermid in the Chicago territory, while Edwin, after being released from the Army, has joined The Udylite Corporation

Edwin A. Stack

of Detroit and is also serving in the Chicago area.

Both men are members of the American Society for Metals and the American Electroplaters' Society.

Pennsalt Shifts Two Sales Chiefs in Midwest

Louis M. Kuilema, formerly district sales manager at the Cincinnati office of Pennsylvania Salt Manufacturing Company, has been placed in charge of the Wisconsin territory as district sales manager. He has moved to permanent headquarters at 20 N. Wacker Drive, Chicago, from his temporary office in Minneapolis.

Charles W. Dermitt has been moved to Cincinnati as Mr. Kuilema's successor after four productive years as assistant to William P. Snelsire, Pittsburgh district sales manager.

Eastern Industries, Incorporated

The Eastern Engineering Co., New Haven, Conn., manufacturer of midget pumps for industrial and laboratory use and of industrial mixing equipment, has been consolidated with the Automatic Signal Corp., East Norwalk, Conn., producer of automatic traffic signals and relays.

The new corporation is designated as Eastern Industries, Incorporated. Personnel of both operating divisions will remain substantially the same under the new organization and both divisions will continue to manufacture the same products but with greater production, sales, and financial facilities.

Hefley Named S-W Eastern Furniture Division Manager

Hugh Hefley, formerly manager of Sherwin-Williams' Winston-Salem Furniture Division, has been appointed manager of the Eastern Furniture Division for the company. Mr. Hefley and his staff will call on eastern manufacturers from Maine to Florida to acquaint them with the new specialized materials and features offered in the Sherwin-Williams furniture finishing lines. Technical and manufacturing facilities at the Sherwin-Williams' Gibbsboro, New Jersey plant have been expanded to serve the furniture industry.

The Sherwin-Williams' Eastern Furniture Division will act as a clearing house for the company on all furniture finishing problems and activities in the East.

How to give a Bigger Bonus

...without budging your budget a bit!

SUPPOSE Bill S., one of your employees, is due for a $75 bonus this year. If you give the bonus in U. S. Savings Bonds, Bill will receive—not $75, nor a $75 Bond—but a *$100* Bond.

Yes, the bonus in Bonds looks like a lot more—and it *is* more. (Every $3 put into U. S. Savings Bonds pay $4 at maturity.) With the same size appropriation, you're actually giving a bigger bonus.

Consider, too, that Savings Bonds mean individual security for each Bond-holder—and collective security for all of us, because they help to control inflationary tendencies. You can easily see that you're doing yourself, your employees, and your country a favor by deciding to . . .

Give the BONUS in BONDS

. . . *and keep up your Payroll Savings Plan!* IMPORTANT: If you have not already received your copy of "How You Can Help Give Free Enterprise a Boost," write on your letterhead to: Room 750, Washington Building, U. S. Savings Bonds Division, Washington 25, D. C. Limited supply. Please write today.

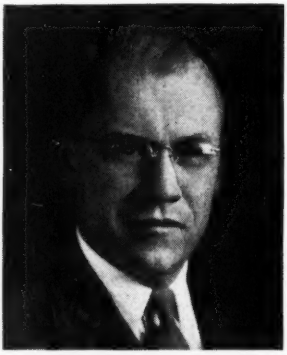
The Treasury Department acknowledges with appreciation the publication of this message by

PRODUCTS FINISHING

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

Appointed Merchandise Sales Manager

The appointment of John A. Buckley, formerly of the General Electric Lamp Department, Nela Park, Cleveland, Ohio, as merchandise sales manager for the G-E Chemical Department is announced by Donald S. McKenzie, general sales



John A. Buckley

manager of the department. Mr. Buckley, who will be responsible for the sale of consumer goods items, will make his headquarters at Pittsfield.

Mr. Buckley has been associated with the sales division of the Lamp Department during the greater part of his career with the General Electric Company which began in 1935. He is a graduate of Ohio State University with a B.S. in industrial engineering, a member of the Illuminating Engineering Society, and the Theta Tau engineering fraternity.

International Nickel Director Passes

Thomas Morrison, a director of The International Nickel Company of Canada. Ltd., and a former director of the United States Steel Corporation, died recently at his home in Spring Lake, N. J. Born in Scotland on December 5, 1861, Mr. Morrison served an apprenticeship as a machinist and engineer in Scotland and came to the United States in 1886. After joining the Carnegie Steel Corporation, he was made superintendent of the Duquesne Works of that organization in 1891 and general superintendent of its Edgar Thomson Works in 1895, from which he resigned in 1901.

Together with Julian Kennedy, Mr. Morrison was co-inventor of a process of slow cooling for rails, known as the Kennedy-Morrison Process. He had been a director of International Nickel Company since May 1917.

Interchemical Adopts New Advertising and Sales Promotion Policy

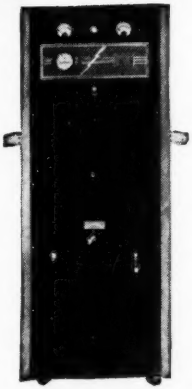
Interchemical Corp., New York, N. Y., has announced a new decentralized policy for its advertising and sales promotion activities. So as to make the corporation's advertising activities divisional responsibilities instead of clearing them through a centralized promotion department, each division, according to George Welp, director of advertising and sales promotion for Interchemical, will

George Welp

now operate through its own sales promotion and advertising personnel working with Interchemical's advertising agency.

Mr. Welp has accepted the responsibility for directing the sales promotion and advertising activities for the two largest divisions, Interchemical Printing Ink and Finishes Divisions, working directly with the executive heads of these divisions.

Speed up and improve ELECTROPLATING *with the* R-A SELENIUM RECTIFIER



9 volts.....2000 amperes	6 volts.....2000 amperes
9 volts.....1000 amperes	6 volts.....1500 amperes
9 volts.....1500 amperes	6 volts.....1000 amperes
9 volts..... 500 amperes	6 volts..... 500 amperes
18/9 volts....500/1000 amperes	12/6 volts....500/1000 amperes

Make your selection of these completely self-contained Selenium Rectifiers with meters, off-on switch and stepless variable control. Standard units can be used in multiple arrangements to obtain 5000 and 10,000 amperes or higher.

WRITE TODAY FOR THE R-A WAY

Rectifier Division

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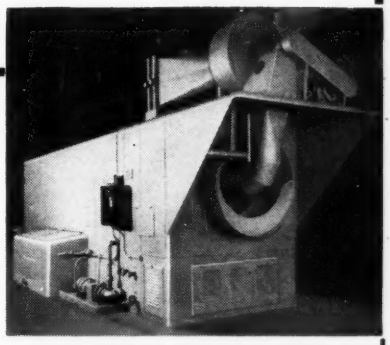
Yes! HOWARD will handle Your TOUGHEST Jobs



Consult Howard Engineers on those "it-can't-be-done" jobs. HOWARD experience and skill have designed and built many machines like that illustrated. Send your parts for free analysis and processing. We'll give you a complete report, with recommendations on methods and equipment. We have the answer to your problem.

MACHINERY FOR PICKLING • TUMBLING • DEBURRING • WASHING • QUENCHING • DRYING • BURNISHING

No. 305 Drum-Type Wash, Rinse and Dry Machine, installed in the plant of a noted Mid-Western Automobile Manufacturer.

Write for New Catalog

HOWARD ENGINEERING & MANUFACTURING CO.

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CINCINNATI 14, OHIO

Two Additions to Pemco Service Staff

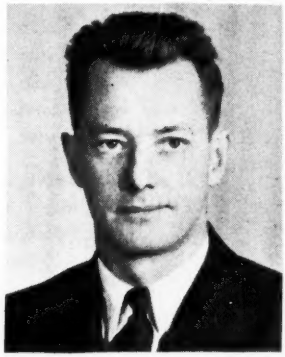
The Pemco Corp., Baltimore, Md., announces the addition of two new engineers to its service staff. Theadore Buit comes to Pemco after 25 years with the Norge Division of Borg-Warner Corp., Muskegon, Mich. Although his assignment will be to the Michigan-Indiana area staff, his activities will not be limited to this particular section and he will, at various times, do service work in other sections.

Herold N. Reed, a graduate of Ohio State University in ceramic engineering, will, for the most part, work with the Pemco Pennsylvania-Ohio and Ohio-Indiana area service staffs, although he, like Mr. Buit, will not be confined entirely to this section. After his graduation, Mr. Reed went to work for the Tyler Fixture Corp., Niles, Mich., where he served as superintendent of the porcelain enamel department until his enlistment in the Army in 1942. He is a member of the American Ceramic Society and the Institute of Ceramic Engineers.

Apothecaries Hall Personnel Changes

The Apothecaries Hall Co., Waterbury, Conn., manufacturer and distributor of industrial chemicals, plating supplies and equipment, announces the appointment of Theodore Voyda as chief chemist, effective November 4. Mr. Voyda holds the degrees of B.S. and M.S. from the University of Connecticut where he graduated with distinction in chemistry. For the past 7 years, he has been employed in the Materials Laboratories, Engineering Department, Pratt & Whitney Aircraft Company, where he was in charge of research and development in plating and metal processing; manufacturing problems, including trouble shooting on production cycles of copper, cadmium, lead, indium, tin, and silver plating, anodizing, metal cleaning and processing; and experimental and pilot plant plating, including extensive work on plating installations of nickel, chromium, silver, copper, lead, and others.

Theodore Voyda



John S. Holley

In his new position, Mr. Voyda will be in charge of laboratory research and development of the company's manufactured line, and will supplement the sales force by working with them in a special and technical service capacity. Mr. Voyda's association with the company should materially strengthen its technical research department and will be reflected in the form of improved consulting service to the trade. He has a thorough knowledge and practical working experience in plating and allied lines, and is a member of the A.E.S. and present president of the Hartford Connecticut Chapter.

John S. Holley, who has been associated with the Apothecaries Hall Company since August 1 of this year, is serving the company in a sales and special service capacity. His specialty is electrical plating equipment.

Mr. Holley graduated from M I T in

Reason: They are safeguarded by Precision Protectors. Keep parts equally safe in storage, too.

PRECISION

DUST CAPS AND THREAD PROTECTORS

Shaped to fit coil forms, fittings, threaded surfaces, ends, and openings —external or internal. Close tolerances. No slip-offs.

SEND FOR SAMPLES

Regular and special shapes to your specifications. Prompt delivery. Write

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"101" Operations Made Easy!

Model F-2 FLEXIBLE BELT

Bench or Floor Type

Grinding, Polishing, Deburring, Chamfering on irregular or regular shaped parts, also eliminate costly hand filing operations!

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BARBER-COLMAN

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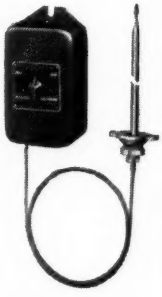

REMOTE BULB MICROTHERM

Plating tanks, anodizing baths, and many other finishing operations where uniform temperature must be maintained, can be improved by using the Barber-Colman automatic electrically-operated "MICRO System" of temperature control equipment. Features include simple construction, no relays, and maximum power at all points of the valve stroke: "Hunting" is eliminated and the valve is positioned quickly with "micrometer accuracy."

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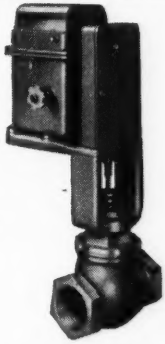
"CONTROLS FOR INDUSTRY"



PROPORTIONING VALVE

BARBER-COLMAN COMPANY

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1935 with the degree of B.S. in electrochemical engineering. Prior to his present employment, he worked in one of the laboratories of Scoville Mfg. Company as a control chemist. His proclivities include practical mechanics, and his training will be helpful in the development of plating equipment sales.

Mr. Holley was on active duty with the U. S. Army in the Coast Artillery Corps between 1941 and early 1946.

Detrex Appoints Processing Equipment Manager

The Detrex Corporation announces the appointment of W. E. Gilbert to the sales department as manager of the Processing Equipment Division. Mr. Gilbert's new duties will deal directly with the numerous phases of automatic cleaning and finishing machines, rustproofing systems, dip tanks, and aluminum processing equipment.

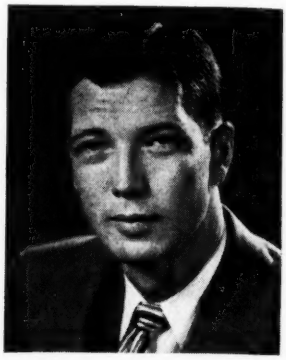
Mr. Gilbert joined Detrex in February 1939 and was soon promoted to factory superintendent of the Drycleaning Division. In 1941, he was appointed plant superintendent in charge of all equipment fabrication, a position which he held until his recent transfer to the sales department.

Mr. Gilbert brings to his new position considerable experience in manufacturing and field erection work. He will be stationed at the main office and plant headquarters at 14331 Woodrow Wilson Ave., Detroit, Michigan.

W. E. Gilbert

Charles Boll Joins Udylite

Charles Wykoff Boll, Jr., has become a member of the staff of the New York office of The Udylite Corporation of Detroit. He will operate in Virginia, Maryland, Delaware, and part of Pennsylvania.



Charles Wykoff Boll, Jr.

Until recently, Mr. Boll was in the Marine Corps, stationed in that organization's plating shops at Washington, D. C., where he served as assistant metallurgist and plant chemist. Before entering the service, he was a chemist with the Harrisburg Steel Corporation. Mr. Boll is well known in Pennsylvania engineering circles.

Elected President of Morrison Engineering

Carl R. Sare, formerly vice president, has been elected president and a director of the Morrison Engineering Corp., Cleveland, Ohio, designer and manufacturer of industrial ovens and furnaces. Mr. Sare attended Penn State Extension College and is a graduate of the University of Pittsburgh. He began his career with the A. M. Byer's Company as a service engineer and following this served the Jones and Laughlin Steel Corporation as a sales engineer.

Prior to joining the Morrison Engineering Corporation, Mr. Sare was associated with the American Steel and Wire Company as a production executive.

American Foundry Equipment Changes Name

The name of the 38-year old American Foundry Equipment Company, Mishawaka, Indiana, has been changed to American Wheelabrator & Equipment Corporation, according to an announcement made by Otto A. Pfaff, president. Mr. Pfaff points out that the new name is more appropriate since one of the principal products of the company is the Wheelabrator, developed by the company and used for cleaning and finishing metal products in many fields.

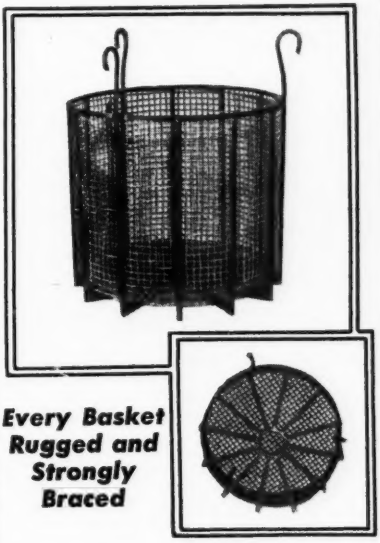
Change in Ransohoff Ownership

A change has been made in the ownership of N. Ransohoff, Inc., Cincinnati, Ohio, producer of various types of metal-cleaning machinery since 1916. John R. Strauss has purchased the controlling interest in the company and will engage in the active management of same. Mr. Strauss brings a wealth of sales and management experience and a record of progressive strides in his former connection which will be of service in his new enterprise.

The new officers of N. Ransohoff, Inc., are Nathan Ransohoff, president, who will devote his entire time to engineering and development; John R. Strauss, vice president and treasurer; Richard C. Wigger, secretary and general manager. Mr. Freiberg, former vice president and treasurer, has retired from active business and will devote his time to private interests.

Patent Data. Considerable technical information is to be derived from the 2,400,000 existing U. S. patents and several hundred new patents that are issued every week. Invention, Inc., a patent research organization in Washington, D. C., has prepared a "Summary of Services" in which procedure to obtain this information is divided into two classifications: (1) Perpetual Research said "to keep know-how continuously current, preventing many problems by vigilance;" and (2) Project Research "to answer questions on know-how, solving problems by diligence." Each of more than 30 patent research procedures is explained in detail in the summary, copy of which may be obtained from Invention, Inc., Munsey Building, Washington 4, D. C.

DIPPING BASKETS



Every Basket Rugged and Strongly Braced

C. O. JELLIFF manufactures a complete line of dipping baskets, round and square, in sizes, mesh, and of metals and alloys to meet your requirements. Complete engineering service available to assist in solving your dipping basket problems.

WIRE CLOTH OF ALL MESHES IN ALL STANDARD METALS AND SPECIAL ALLOYS

WIRE PRODUCTS jelliff SINCE - 1860

The C. O. Jelliff Mfg. Corp.

124 Pequot Road
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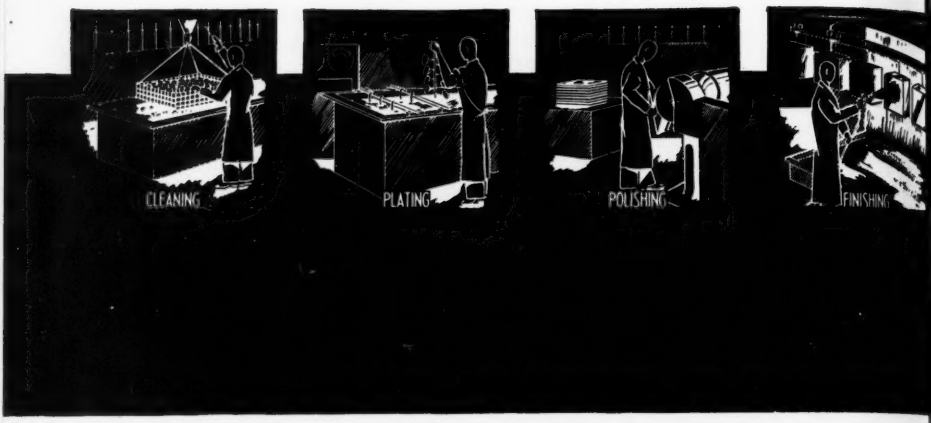
UNIVERSAL
finishes
SUNBEAM

that aid
appearance
and utility

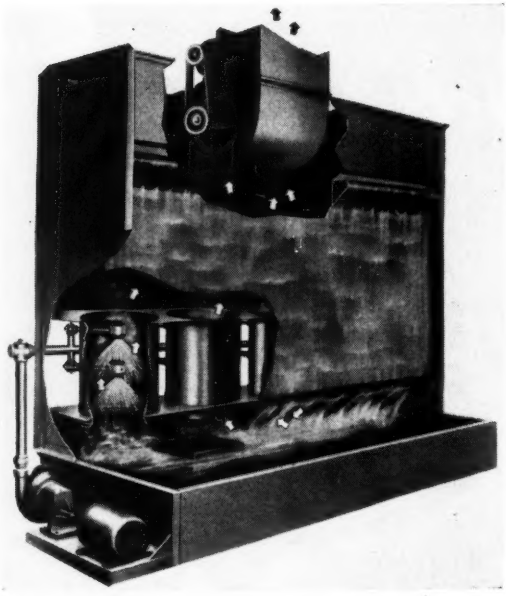


Newcomb-Detroit Water Tube Spray Booth

A water tube spray booth which is delivered 90 per cent preassembled so as to reduce installation time to a minimum is announced by the Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich. The unit is a water curtain type booth and incorporates a series of tubes to clean the paint-laden air. Inside each tube are two high velocity clog-proof nozzles which wash the air twice. The air is then drawn by suction through moisture separators and discharged.

An important advantage of the design is the fact that the discharge fan is built-in, thus eliminating the necessity for construction and installation of an overhead platform for mounting the fan, motor, and drive, and also permitting easy movement of the entire unit when necessary. In addition, the water recirculating pump and motor are mounted directly on the tank, thus making an integral unit and thereby permitting assembly of the pump suction and spray header prior to shipment.

The Newcomb-Detroit Water Tube Spray Booth is available in five sizes of 5,000, 7,500, 10,000, 12,500, and 15,000 c.f.m. which may be used individually or in combination for unit or production-line paint spraying.



Necomb-Detroit Water Tube Spray Booth

Du Pont No. 4665 Industrial Adhesive

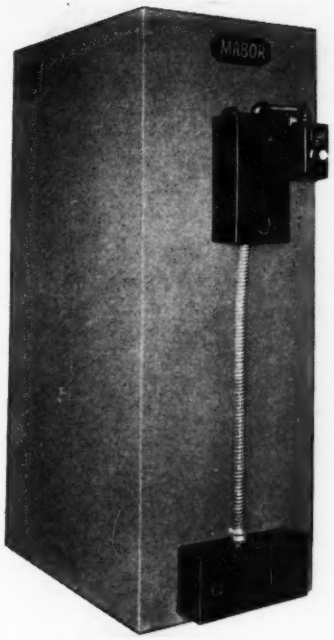
An industrial adhesive that is said to require no catalyst or special preparation for use, designated as Du Pont No. 4665, is announced by the Finishes Division, E. I. du Pont de Nemours & Co., Wilmington 98, Del. The adhesive is described as being tough and flexible, suitable for bonding metal foils and metal sheets to wood, plastics, vulcanized synthetic and natural rubbers, as well as other substances having widely different coefficients of thermal expansion.

Du Pont No. 4665 Adhesive can be applied without thinning, by brushing, roller coating, knife coating, or dipping methods. It contains 27.5 per cent solids. Although insoluble in water, its bond strength is lowered by continued immersion. However, original bond strength is said to be regained after removal from water. The dried adhesive film is claimed to be resistant to dilute alkalis, acids, and corrosive salt solutions, and to be unaffected by petroleum or coal-tar solvents, lubricating oils, alcohols, ethylene glycol, or vegetable oils, but is soluble in ketones or ester solvents.

Mabor Improved Vapor Degreaser

An improved vapor degreaser embodying a uniquely controlled cool-air principle has been developed by the Mabor Co., Walnut St., Clark Township, Rahway, N. J. In addition, the equipment is so designed as to require only the plugging into a power line in order to start its operation, and is equipped with heavy duty casters, thus enabling it to be used as a portable unit for operations in any section of the plant.

The Mabor Improved Vapor Degreaser is self-distilling and completely self-contained, thereby eliminating the need for an outside vessel or barrel. Built-in storage tanks are provided as a part of the unit, the contents of which can be entirely distilled without danger of overheating due to an exclusive jacket heating system, the manufacturer states. By increasing the flow of cooling air, vapor level oscillation is said to be substantially reduced and, as a result, the consumption of solvent is also reduced proportionately. An extra heater of foot pedal-operated design helps to increase the vapor formation and overcome the shock load as work is placed in the machine.



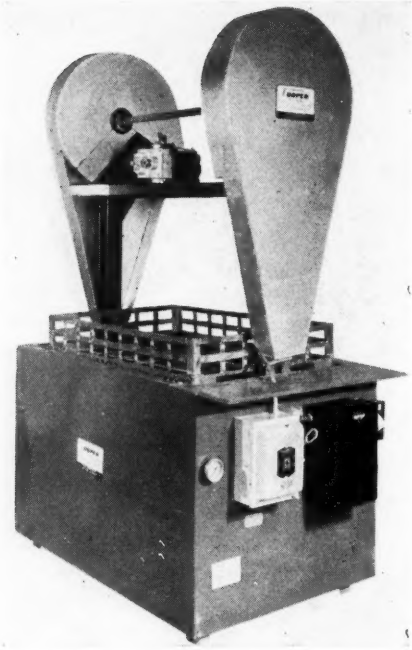
Mabor Improved Vapor Degreaser

According to the manufacturer, the Mabor Improved Vapor Degreaser is efficient on light, as well as heavy, metals, since a hand hose and flush pump supplied as standard equipment of the machine allow for the degreasing of lighter gauges which do not condense solvent vapor for effective cleaning.

Cooper Automatic Motorized Tank

Especially designed for the automatic washing and cleaning of metal parts, an automatic motorized tank providing continuous agitation is announced by the D. C. Cooper Co., 1467 S. Michigan Ave., Chicago 5, Ill. The tank can be supplied for cold dipping or hot cleaning or dipping, and can be heated by electricity, gas, or steam.

The Cooper Automatic Motorized Tank is sturdily built of heavy steel through-



Cooper Automatic Motorized Tank

out, and, on the heated models, rock wool is thickly packed between the inner and outer tank shells to keep the outside of the tank cool, as well as provide for economical operation by the prevention of heat loss. Inside the tank is a special heavy steel rack. The top of the rack frame is equipped with unique gears, arms, fittings, geared motor, and cut-off switch so constructed as to permit the inside rack to raise or lower continuously until stopped by pressing a button on the switch. The rack automatically raises and lowers approximately 10 times per minute. The travel speed of the track can be increased or decreased.

The Cooper Automatic Motorized Tank is available in sizes ranging from 60 to 300 gal. capacity and is said to be ideal for dipping metal parts or other objects in wax or rust preventives. The construction of the unit is such that by the simple insertion of a bolt, the rack can be adjusted to stop after each dipping operation, thus making the equipment especially effective for wax dipping and rust-proofing operations.

"Mulsirex"

"Mulsirex," an emulsifying agent designed for use with kerosene and other petroleum cleaning agents, is now being introduced by Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif. The product is recommended for removing very heavy deposits of oil and light grease from all kinds of metal parts and equipment.

In solution with petroleum cleaning agents, Mulsirex, according to the manufacturer, adds to the cleaning potency of these agents through its deep penetrating qualities, and, at the same time, because of its unusually high flashpoint (180 deg. F.), greatly increases the margin of safety for the operator. The emulsifying characteristics of the product are said to make foreign substances readily soluble in water, a feature that permits the deposits to be flushed away after application of the cleaning agent with a simple cold water rinse.

Since it can be used in dilutions as high as 1 to 10 with solvents, the manufacturer points out that Mulsirex is unusually economical to use. It can be

TO PRODUCE OXIDIZED FINISHES ON COPPER, SILVER OR BRASS:
TO STRIP COPPER EVENLY WITHOUT HYDROGEN EMBRITTLEMENT

USE

McKeon's "Liquid Sulphur"

SIMPLE — EASY TO USE — WRITE FOR FREE SAMPLE AND DETAILS

SULPHUR PRODUCTS CO. Greensburg 7, Pa.

quickly and easily applied with a spray, brush, or mop, or as a cold tank immersion solution, and is claimed to be absolutely harmless to metals and enameled surfaces.

Klinch Grain Cement

An improved adhesive for polishing wheels, to be known as Klinch Grain Cement, is now being marketed by the Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

The cement can be used for wheels employed in polishing stainless steel, steel castings, die castings, brass, aluminum, steel, and other materials. It is supplied in 1 and 5-gal. cans and 50-gal. steel drums.

Eclipse "45" Spray Gun

The Eclipse Air Brush Co., 424 Park Ave., Newark 7, N. J., announces a lightweight low-pressure spray gun for products finishing, designated as the "45." According to the manufacturer, the gun not only provides an adjustment for external fan width control but can also be fitted with an exclusive cone-fan internal nozzle.

Eclipse "45" Spray Gun

The Eclipse 45 Spray Gun can be obtained with an assortment of tips and nozzles to meet practically any finishing requirement.

Save COSTLY PRODUCTION TIME

PANOCO Die-Cut MASKING TAPE

CUT TO YOUR OWN SPECIFICATIONS
ANY SIZE . . . . . ANY SHAPE

ELIMINATES REWORK AND TOUCH-UP TIME

Protect surfaces in spraying, plating, buffing and polishing operations, this modern, easy way. Speed work preparation.

RESISTS HIGH TEMPERATURES

PANOCO MASKING TAPE — DIVISION OF PAPER NOV. MFG. CO.
505 CARROLL STREET, BROOKLYN 15, N. Y.

Aeroil Model No. 5 Plast-O-Dip Tank

Designed for plastic skin protective coating dipping operations, a new model of its Plast-O-Dip Tank, designated as the Model No. 5, is announced by the Aeroil Products Co., 5701 Park Ave., West New York, N. J. Variable speed mechanical agitation is provided throughout the entire contents of the tank by means of an air-powered, ball bearing, non-clogging turbine motor. Maximum safety control is afforded through the use of double thermostatic reaction in conjunction with an automatically controlled cooling system. Provision is made for the rapid cooling of the melt when necessary, thereby enabling the user to quickly change the viscosity of the skin coating.

The Model No. 5 tank is indirectly heated by means of an agitated hot oil bath that can be thermostatically controlled at any temperature from 100 to 550 deg. F. To permit the use of automatic dipping equipment, the level of the melt can be constantly maintained through the medium of an adjustable weir located at the end of the tank. The enlarged premelt section and feeding hopper form a self-contained unit for uninterrupted production.

Both the tank and cover of the unit

Aeroil Model No. 5 Plast-O-Dip Tank

are heavily insulated to conserve heat during nondipping periods. Hinged housings are said to protect all parts from dripping compound, and a built-in dial thermometer and thermostat with knob dials and pilot lights provide for a swift

Quality Chemicals for over 50 years

PHELPS DODGE REFINING CORPORATION
NICHOLS
TRIANGLE BRAND
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CHEMICALS
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COPPER SULPHATE
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GOLD PLATING SOLUTIONS

In All Colors

Guaranteed 100% Pure Gold Content
Troy Weight - Color Constant
Tarnish Resistant
Proven Quality by the Acid Test

Write or call our experts about your plating problems

Davis-K-Products Co.
114 Lexington Ave., New York 16, N. Y.
Lexington 2-7360
2-3816

visible check of oil bath temperatures. If desired, the tank can be obtained with explosionproof fittings and connections for compounds of high vapor transmission, in which case it is designated as the Model No. 5E.

Miccromask Stop-Off Lacquer

Described as excellent in the masking of machined parts for hard chromium plating, a stop-off lacquer to be known as Miccromask is announced by the Michigan Chrome and Chemical Co., 6340 E. Jefferson Ave., Detroit 7, Mich. Easy to apply by either the brush, dip, or spray method, the material possesses rapid-drying qualities, thereby reducing drying time between coats and in the preparation of work for racking.

According to the manufacturer, Miccromask Stop-Off Lacquer has unusual adhesive qualities but can be easily removed after plating. Moreover, it is said to have good dielectric strength, resulting in a clean line of demarcation with no loss of current. With no possibility of a lacquer etch on precision-lapped finishes, the material, the manufacturer claims, is absolutely neutral and will not contaminate any plating solution.

Miccromask is available in red and black, identical in all physical characteristics.

Houghto-Clean 200 Series Cleaners

A series of 17 different cleaners, including cleaners for maintenance work, ferrous and non-ferrous metals prior to painting or vitreous enameling, as well as electrolytic cleaners and special purpose compounds, has been developed by E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa. In formulating the products, which are designated as the Houghto-Clean 200 Series, advantage has been taken of recent developments in detergency and wetting out wherever feasible. New synthetic detergents, as well as new alkalis, have been adapted in several of the products.

According to the manufacturer, the Houghto-Clean 200 Series Cleaners are designed to provide for increased speed and efficiency so that alkaline cleaning can be employed on the production line with a considerable saving of time.

SUPPLIES

THE MUNNING LINE

—Better Quality

- These are difficult times for the metal finisher to keep going, due to shortages in first one item and then another.
- Nobody can supply material which is nonexistent; but it pays best to deal with a firm with wide supply connections.
- Such a firm can often procure from some source a particular article which cannot be secured at all by someone with more limited connections.

MUNNING & MUNNING, Inc.

Designers . . Engineers . . Manufacturers

***Main Office and Plant:* 202-208 Emmet St.**

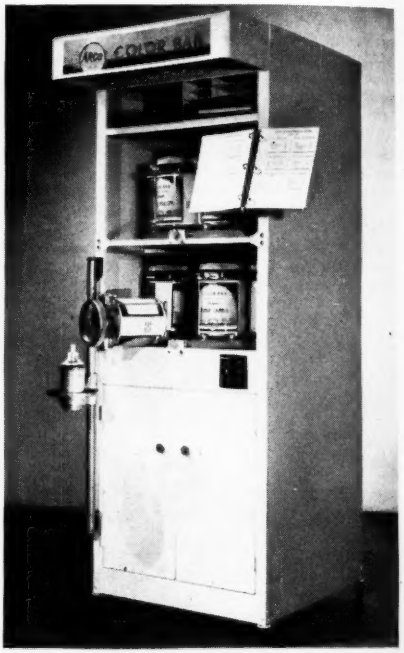
NEWARK 5, N. J.

New York Philadelphia Woonsocket, R. I.

Arco "Color Bar" Paint-Mixing Machine

Designed to fit into a 29-inch square of floor space, a motor-controlled paint-mixing machine to be known as the Arco "Color Bar" is announced by The Arco Co., 7301 Bessemer Ave., Cleveland 4, Ohio. Featuring automatic rotoplane agitation, the machine is constructed to hold 16 one-gallon cans on two turntables which revolve around a single motor-operated drive shaft. Rotation of the drive shaft propels stirring mechanisms inside the individual cans to ensure uniform premixing of base colors.

Designed to concentrate all pouring in a single position, the Arco Color Bar includes mechanical controls, combination cut-off valves and air vents, and is mounted in a sturdy, enameled steel cabinet having built-in lighting, label racks, shelves and easel for formula books, as well an enclosed storage space capable of holding 32 one-gallon cans. The unit is supplied equipped with casters, completely set up and ready for us.



Arco "Color Bar" Paint-Mixing Machine

For CONTROLLED RADIANT HEAT—

NALCO INFRA-RED LAMPS

Quick, penetrating heat of Nalco Infra-Red Lamps is easily controlled. Can be used on large or small jobs with speed and efficiency. Write for "Drying Problems Made Easy."

North American Elec. Lamp Co.

1030 Tyler St. St. Louis 6, Mo.

Harrison 4-A Products

SUPERIOR COMPOUNDS

for

Cutting—Cut and Color
Mirror Finishing
Mean

FASTER CUTTING
INCREASED PRODUCTION
GREATER ECONOMY

Write us for samples to meet your special needs

HARRISON & COMPANY

Haverhill, Mass.

Colonial Aluminum Treating Process

According to an announcement made by the Technical Processes Division, Colonial Alloys Co., Philadelphia 29, Pa., aluminum and its alloys can now be treated to very closely resemble brass and

chromium. High refective mirror effects are obtainable and after-lacquering is said to be unnecssary. The finished surfaces are described as having good corrosion resistance and abrasion resistance. The finish is a part of the surface of the aluminum which has been electrochemically changed to produce the result. Surfaces are maintained by washing now and then with a mild soap solution.

The common aluminum alloys, such as 2S, 3S, 52S, 53S, 56S, "Alclad," and "Pureclad," are said to respond well to the treatment. They should, however, be free of scratches, draw and roll marks, and so on, or these will appear in the final finish. A prefinish equivalent to a 200 mesh (or finer) treatment results in uniform reflective surfaces after subjecting the Colonial process, it is claimed.

Hercules CMC

The Hercules Powder Co., Inc., Wilmington, Del., announces the commercial manufacture of CMC, a cellulose derivative. This water-soluble cellulose gum is the sodium salt of carboxymethl-cellulose formed by the reaction of monochloroacetic acid with alkali cellulose and is available in three viscosity types; Low, 25 to 50 cps. at two per cent concentration; Medium, 400 to 600 cps. at two per cent concentration; and High, approximately 2,000 cps. at one per cent concentration.

According to the manufacturer, CMC is water-soluble yet can be made relatively water insoluble; is adhesive but not sticky; is insoluble in organic solvents; forms tough films, and not only act as an emulsifying agent in oil-in-water emulsions but also protects the emulsion. CMC is claimed to greatly increase the viscosity of water and also makes it possible to carefully control the viscosity of any solution in which it is used. CMC is relatively non-hygroscopic both in solution and film, is compatible with many water-soluble materials such as gums, plasticizers, and resins, and presents no fire hazard since it chars only at temperatures above 235 deg. C., the manufacturer states.

Its stabilizing and film-forming properties are said to make CMC ideal for use in emulsion paints and lacquers where it also aids in pigment dispersion.

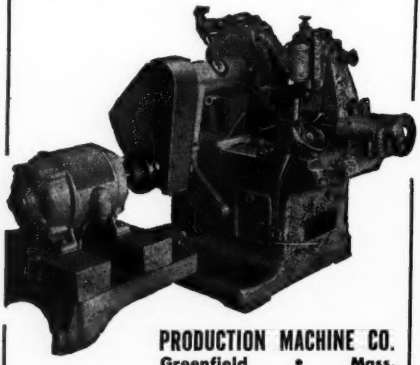
Silco Glass-Base Spray Coat

Silco Glass-Base Spray Coat, a baked finish that is said to impart extremely high resistance to corrosion, abrasion, and impact and to withstand heat up to 1,000 deg. F., is now being marketed by the Mitchell-Bradford Chemical Co., 2446D Main St., Bridgeport, Conn. The product is particularly recommended for finishing exhaust pipes, mufflers, stoves, heaters, and numerous other steel and brass products exposed to disintegration.

Silco Glass-Base Spray Coat is available in many colors and shades and is said to be an ideal finish where attractiveness and durability are prime requisites. Easy to work, Silco can be sprayed with any regular equipment and dries at 200 deg. F. The finish can then be baked in any industrial oven at 350 deg. Fahrenheit.

FINER FINISHING

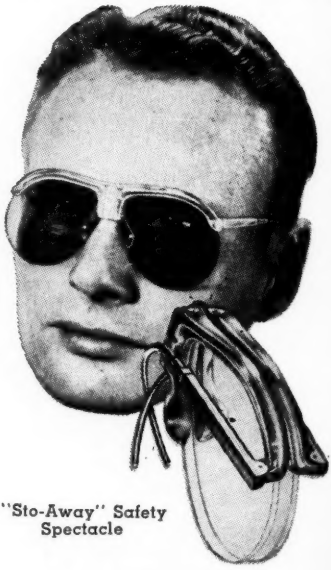
This "PRODUCTION" Model 101 centerless feed polishing machine produces better finishing at a lower cost and is especially designed for high-speed tube and rod polishing. It feeds automatically without centering, chucking or holding. All parts are guarded and readily accessible for changing the wheel. The construction is rigid and durable throughout. Write for illustrated folder.



PRODUCTION MACHINE CO.
Greenfield • Mass.

"Sto-Away" Safety Spectacle

An all-plastic folding safety spectacle to be known as the "Sto-Away" is now being marketed by the Watchemoket Optical Co., Inc., Providence 3, R. I. The design includes a semi-rimless type



"Sto-Away" Safety Spectacle

frame which is hinged to fold at the bridge. A new type of hollow stainless steel temple telescopes to one-third normal length, and the entire goggle can be folded to approximately the size of a pack of cigarettes.

The lenses are made of shatterproof Impax plastic which is said to be especially resistant to high-velocity impact. The lenses, which are available in clear or green tinted types, are instantly interchangeable and are rigidly locked in the deep-channeled Plexene plastic frame. The hinge between the temple and frame is designed to lock automatically in the open position, and the temple is available in three different lengths.

For a real good polishing job use

KEYSTONE EMERY

TURKISH — NAXOS — AMERICAN

KEYSTONE EMERY MILLS *Write for Sample* **4316 Paul St., Phila., Pa.**

"Presto" Improved Contact Wheel

Cool-running qualities, which permit use on semi-automatic polishing lathes,

"Presto" Improved Contact Wheel

are among the improvements claimed for a newly developed contact wheel announced by The Manderscheid Co., 810 Fulton St., Chicago 7, Ill., as an addition to its line of "Presto" products. Five plys of cool-running rayon cord, such as used for truck tires, make the wheel suitable for semi-automatics by keeping it cool and holding its shape, the manufacturer states. Holes through the rubber provide for additional cooling beneath the surface and produce the action which snaps the abrasive belt as it leaves the work, beating it clean with 72 hammer blows per revolution of the 14-inch wheel.

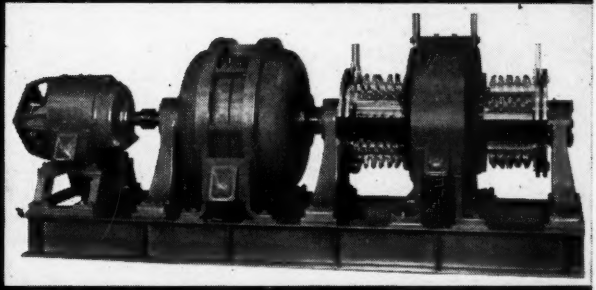
The Presto Improved Contact Wheel is available in 9 and 14-inch diameters and in 2, 3, and 4-inch face widths. According to the manufacturer, diameters are precisely uniform so that two or more wheels can be used together to produce any desired face width.

Precise-40 Electric Handtool

Designated as the Precise-40, an electric handtool of 1/5 h.p. and with speeds to 40,000 r.p.m. has been placed on the market by the Precise Products Co., 1328 Clark St., Racine, Wis. The tool can be used for grinding, deburring, polishing, finishing, engraving, and other operations on metals, plastics, and so on.

COLUMBIA MOTOR GENERATORS

for Electroplating and other Electrolytic Processes



Columbia Generators embody every feature essential for dependable, 24-hour operation. They are built for electroplating service in sizes of 6 to 20 volts, 500 to 20,000 amperes, for anodic treatment of aluminum in sizes of 40, 50, and 60 volts, 500 to 3,000 amperes. Columbia Generators for other electrolytic processes range from ½ to 250 KW, 100 to 40,000 amperes, 6 to 60 volts. Write for full information.

COLUMBIA ELECTRIC MFG. CO.

4519 HAMILTON AVE., N.E. CLEVELAND 14, OHIO

Provided with a high impact plastic housing, the tool weighs 40 ounces.

Features of the Precise-40 include a large rigid precision quill provided with a No. 0 Morse taper for the interchangeable mounting of a precision collet chuck for rotary cutters and millers, a Jacob's chuck for small diameter drills, or special arbors for unmounted wheels and abrasives. Special spindles can also be mounted to extend the quill length for internal grinding and engraving.

Four high speed ball bearings supporting the quill and motor shaft can be quickly pressure lubricated through ball valve inlets by means of a small pressure gun furnished as standard equipment. Cooling is accomplished by an aerodynamic fan mounted on the motor shaft which draws air in through ports at the top of the housing and releases it over the chuck through enlarged vents. In addition to cooling the chuck and the material in work, the concentrated blast of air blows away dust and chips.

The P-40 can be used alone as a handtool or mounted in a stand, vise, lathe, or milling machine. Accessories for special uses include a Coolflex flexible shaft attachment for close work, speed controls (foot and bench models), Precise drill stand, Precise lathe attachment, and Precise Vari-Speed lathe.

Precise-40 Electric Handtool

New Literature

"Your Start at Industrial Finishing Company" is the title of a 16-page employee induction manual now being issued by the Industrial Finishing Co., 1164 W. Cermak Rd., Chicago, Ill. The manual is designed to inform old, as well as new, employees about the company's history, its equipment, its policies of operation, its rules of conduct, and its many employee services. Cartoon-style drawings are included throughout the manual to illustrate the text in an interesting and effective manner.

Interested executives can obtain copies of the manual by writing direct to the above firm on their company letterheads.

Are you rumbling around for a way to polish metals? Why not check Lupomatic's method.

For efficiency in finishing metal parts, install a DEBURRMASTER.

Save time, money and produce assured results.

LUPOMATIC TUMBLING MACHINE CO., INC.
4510 BULLARD AVE. BRONX, N. Y.

ALLWOOD

"Vienna Brand" Lime

Made from Limestone that is identical in chemical analysis and geological structure with European Imported Lime. Tests show a "lime cake" made from Allwood "Vienna Brand" Lime equals the finish made from imported lime.

WRITE FOR FULL PARTICULARS

ALLWOOD LIME COMPANY
Manitowoc • Wisconsin

"Production Plating of Zinc Die Castings" is the subject of a reprint now being distributed by The Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio. Written by Herbert Chase, the article describes the bright copper-nickel-chromium plating of zinc die castings on a high production basis at the plant of the Electric Auto-Lite Company. Solutions, current densities, and conveying arrangements are discussed in considerable detail. Copy of the reprint is available free upon request.

"How to Pack Your Durcopump" is the title of a four-page instruction bulletin published by The Duriron Co., Inc., Dayton 1, Ohio. Written specifically to apply to the company's own line of corrosion-resisting pumps, the information in the bulletin is also applicable to all chemical or corrosion-resisting centrifugal pumps.

The bulletin provides complete instructions on the selection and correct installation of the proper packing for each size pump and type of service. The bulletin also includes information on special stuffing box arrangements, such as liquid seal, lubricant seal, recirculating liquid seal, and rotating metallic seal. In addition, it deals with slurry problems and the handling of high-suction heads. A description of the types of corrosion-resistant packing produced by the company is further provided. Copy of Bulletin No. 813 free upon request.

"Du Pont Color Conditioning for Industry" is the title of a 32-page bulletin illustrated in full color which is now being issued by the Finishes Division, E. I. du Pont de Nemours & Co., Dept. M-6, Wilmington 98, Del. Illustrating and describing years of research and practical experience with color to increase production, improve seeing conditions, and create better working environment, the booklet makes clear the fundamental principles on which color conditioning is based.

The "three-dimensional seeing" treatment of machines is depicted with photographs of actual installations. The Safety Color Code for Industry is also outlined. Color conditioning is shown at work in plants of several well-known companies. A coordinated functional color program for an entire plant is illustrated in a double-page cutaway drawing. Copy of the bulletin is available free to mechanical executives addressing requests on their company letterheads.

Hammond of KALAMAZOO

BACKSTANDS
CONVERT
GRINDERS-POLISHERS
into high production
ABRASIVE BELT UNITS

Hammond Variable Speed Polishing Lathe and No. 3 Backstand installation.

Hammond Machinery Builders, Inc.
1622 Douglas Ave. • Kalamazoo 54, Mich.

"THE SIMPLICITY ANODE"

A heavy cast anode for chromium plating that provides:

1. Ample cross section for Conductivity.
2. A novel design that provides considerable edge length and provision for solution circulation.
3. A heavy hook that makes positive screw contact and which can be used over and over again.

Write for further information to

METALLURGICAL PRODUCTS CO.
35TH AND MOORE STREETS
PHILADELPHIA 45, PA.
Established 1909
Manufacturers of Copper-Brass-Lead Anodes

"Presto" Contact Wheels and Back-Stand Idlers for abrasive belt finishing are illustrated and described as to construction features, advantages, operation, and application in a four-page bulletin published by The Manderscheid Co., 810 Fulton St., Chicago 7, Ill. Specifications for both types of products are also included in the bulletin, copy of which is available free by requesting Bulletin 104.

"A Trip Through Hercules Land," a four-color non-technical illustrated booklet explaining how Hercules products are utilized in 12 major industries, is now available free from the Hercules Powder Co., Inc., Wilmington, Del. In addition to the more complete story of the use of Hercules products in the 12 major industries, including adhesives, protective coatings, plastics, and so on, the booklet contains a list of 41 industries together with the Hercules products utilized in each of the industries.

The cover of the 8½ x 11-inch booklet is a colored map of "Hercules Land" which is divided into six segments, each segment representing a Hercules operating department.

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Directions for Hull Cell Plating Test are contained in a 15-page booklet prepared by R. O. Hull & Co., 1279 W. Third St., Cleveland 13, Ohio. Copy free upon request.

"How to Use Carbon Tetrachloride Safely: Tips to the Foreman" is the title of a folder issued by the Safety Research Institute, 420 Lexington Ave., New York 17, N. Y. The folder includes information on the proper handling and storage of carbon tetrachloride, as well as directions for first aid in case of accident. Copy free upon request.

"Buffalo" Industrial Exhausters for material and air handling are fully illustrated and described in a 32-page bulletin published by the Buffalo Forge Co., P. O. Box 985, Buffalo 5, N. Y. Ratings for all of the wide variety of models in which the exhausters are available are published in full. Dimensional drawings are also included in the bulletin, copy of which is available free to mechanical executives requesting Bulletin No. 3576.

"Dustkops Stop Dust and Lint from Polishing and Buffing," a bulletin containing suggestions on installing individual dust collectors for collecting dust, lint, and rouge originating from polishing, buffing, and metal coloring operations, is now being offered by the Aget-Detroit Co., 602 First National Bldg., Ann Arbor, Mich. The bulletin includes illustrations of typical installations of Dustkop dust collectors, and dimensions and prices of the Model 1150 Dustkop unit. Copy of Bulletin No. 392 free upon request.

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"The Protective Value of Lead and Lead-Tin Deposits on Steel," a paper presented by A. H. DuRose, metallurgist, at a recent meeting of the Electrochemical Society, Inc., is the subject of a 16-page reprint now being distributed by The Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio. Copy free upon request.

Acid Metal Cleaners. Nielco Laboratories, 1632 W. Lafayette St., Detroit 16, Mich., announces a technical data sheet on Ferr-O-Niel and Galv-A-Niel Acid Metal Cleaners for cleaning ferrous metal, galvanized surfaces, zinc die castings, and cadmium plated metal. Copy free upon request.

Packaging Materials. The Protective Coatings Corp., 689 Main St., Belleville 9, N. J., has issued a 16-page 8½ x 11-inch brochure on its various products for the protection of packaged products in transit or storage. Described are Aquastop (two types); M-V-Var; Antaqua waterproof coating; and Plastipeel for protecting metal parts with a unique, peelable plastic coating. Numerous charts and illustrations interpret physical characteristics and procedures; the application of Aquastop as case panels or prefabricated bags; and the methods of sealing to provide a completely waterproof package. Results of tests made by the manufacturer and users of the several materials are described in detail as are the methods of application in a number of forms to a wide variety of end products.

Also described in the brochure is an interesting seven-week test of the waterproof qualities of Aquastop which was made in the salty, brackish waters of the Passaic River. Copy of brochure free upon request.

Lima Pedestal Grinder and Polishing and Buffing Lathe are among the products illustrated and described in a six-page bulletin released by The Lima Electric Motor Co., Lima, Ohio. Other products covered include a drip-proof electric motor and a gearshift drive for all types of new or used machine tools or production equipment. Copy free upon request.

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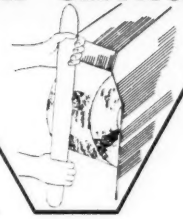

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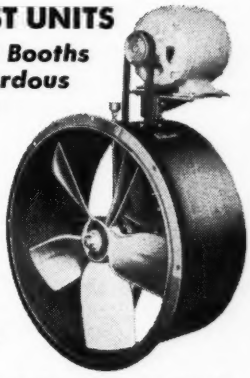

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